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APPAREL RESEARCH NETWORK (ARN) PROGRAM

Final Technical Report
(Contract Number SPO103-02-D-0018/ Delivery Order 0004)

Fully Automated Supply Chain Management at MCRD-PI

Prepared for

Apparel Research Network (ARN) Program
Defense Logistics Agency
April 2004

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PREFACE

This Final Technical Report covers work accomplished for the Apparel Research Network (ARN) of the Defense Logistics Agency (DLA) in conformance with Delivery Order 0004 during the period 6 June 2002 to 6 December 2003.

It specifically covers the analysis, design, development, rollout, and ongoing support of the ARN Fully Automated Supply Chain Management solution for Marine Recruit Depot – Parris Island (MCRD-PI).

The implementation of the ARN Fully Automated Supply Chain Management solution incorporates: (1) the Virtual Item Manager-Wholesale Local (VIM-WL) web based inventory management application; (2) both a wired and wireless network outside the Marine Corps firewall; (3) electronic forms filing and management with CabinetNG; (4) RF applications with hand-held terminals (HHTs) for warehousing data capture; and, (5) the integration of 3D Body Scanner technology for automation of uniform fitting and issue data capture.

The fully automated supply chain management solution is part of the ARN solution to reduce military clothing inventories through automated systems for asset visibility at the wholesale, retail and manufacturing levels and balanced flow replenishment. Prior to September 2001, MCRD-PI was using the ARN Balanced Inventory Flow Replenishment System (BIFRS) and the MUMMS system to manage the Marine Corps owned clothing assets.

By May 2002, the ARN Quality Logistics Management (QLM) system and the ARN Control Panel had been installed. The implementation of these two applications coincided with the transfer of ownership of the clothing assets to the Defense Logistics Agency (DLA), Defense Supply Center Philadelphia (DSCP).

The decision to move to the ARN Fully Automated Supply Chain Management System was made in June 2002. This initiative was made in an effort to gain greater visibility of the supply items issued to recruits and begin to capture warehousing data at the source.

ARN Program information is available from the ARN web site at http://arn2.com.

1.0   EXECUTIVE SUMMARY

1.1   Overview

The Apparel Research Network developed innovative technological solutions that improved recruit clothing supply chain management processes within DLA. But, as demonstrated with this short-term project, tremendous opportunities to improve inventory accuracy rates were still available. Marine Recruit Depot - Parris Island was the test site for the integration of these existing systems and the development of new solutions that could bring even greater efficiencies to the recruit clothing supply chain management process.

The integration project consisted of two (2) phases (the first phase was accomplished in May 2002 – see Phase I reference EDI FTR DO 0013 on the ARN web site). The Phase II work comprising this short-term project included tying all of the ARN retail level systems together and incorporating new applications and technology strategies.

Phase II consisted of enhancements to the scan forms which allowed for improved accuracy and processing speed of the data collected; enhancements to the audit capability through interfaces with smart card and bar-code technologies; validation of the size selection accuracy of the 3D Whole Body Scanner; automation of the receiving, stock movement and physical inventory functions through radio frequency hand-held data collection devices and bar code technology; conversion from the client/server based QLM/Local inventory management system to a web-based retail level inventory management system incorporated in VIM and, integration of the 3D Whole Body Scanner into the supply chain by capturing and processing issue data, from the Male 02 issues.

The anticipated benefits were centered on improved inventory accuracy, ease of use and faster processing of recruits through the issue stations, faster and more efficient forms scanning, and incorporation of 3D Whole Body Scanner predicted sizes into the Phase II issue forms. These enhancements and technology integration would ensure that recruit issues were accurately and quickly recorded, thus giving DSCP Item Managers better production requirements data. This in turn would lead to more accurate wholesale-local inventory requirement predictions and would allow for better management reports such as fill rate reports.

1.2   Project Approach

The AdvanTech, Inc. project team developed a technology assessment report that delved into MCRD-PI's current processes, areas for efficiency enhancements, networking requirements, security requirements, final equipment lists and an implementation plan for the rollout of the new integrated solution.

Once approval of the technology approach was received, the following sequential approach was taken: (1) install the wired ARN-LAN; (2) install the wireless network; (3) move the scan station computers to the ARN-LAN; (4) move the QLM/Local application and server to the ARN-LAN; (5) upgrade the Control Panel software; (6) implement the RF applications for receiving; (7) incorporate SmartCard technology into the AutoData Scan Forms application; (8) convert the QLM/Local application to the web-based VIM/Wholesale Local program; and, (9) move the Cyberware 3D Whole Body Scanner onto the ARN-LAN and integrate the predicted sizes into the Control Panel.

1.3   Short Term Project (STP) Objectives

Ultimately the goal of this STP was to provide a comprehensive and integrated solution to MCRD-PI that would allow for tighter management and control over the DLA supply assets while enhancing the efficiency of issuing clothing to recruits. The specific objectives were to:

➢   Improve the layout of the scan forms to allow for easier use by MCRD-PI staff and recruits.

➢   Implement a comprehensive audit trail that ensured both active and reserve issue data is captured and appropriately reported.

➢   Implement the recruit Smart Card interface in order to quickly capture data for the ARN Control Panel.

➢   Populate the recruit's Phase I issue form with the captured Smart Card data.

➢   Implement an electronic document management system to store and retrieve issue forms more efficiently.

➢   Determine the improvement in speed and accuracy of the Phase II issue capture through use of the 3D Whole Body Scanner to obtain recruit size and identification data.

➢   Provide a technical report on the potential for improvements in the 3D body scanning process.

1.4　　System Architecture

The ARN Local Area Network (LAN) is a self-contained network outside the Marine Corps firewall. Fiber optics, connecting the network was provided by the Marine Corps at Parris Island, but the switches that route the data/signals to the ARN-LAN were installed by AdvanTech, Inc. on the ARN network. All issue data from scan forms and receipt data from the hand-held terminals is captured and sent over fiber or category 5 cables through an ARN switch to the ARN server. Body measurements from the 3D Body Scanner are converted to sizes and the subsequent data is integrated into the scan forms. Every 15 minutes the ARN server is polled by VIM routines for new issue and receipt data. This data is then pulled back and processed into VIM Wholesale Local through a digital cable modem.
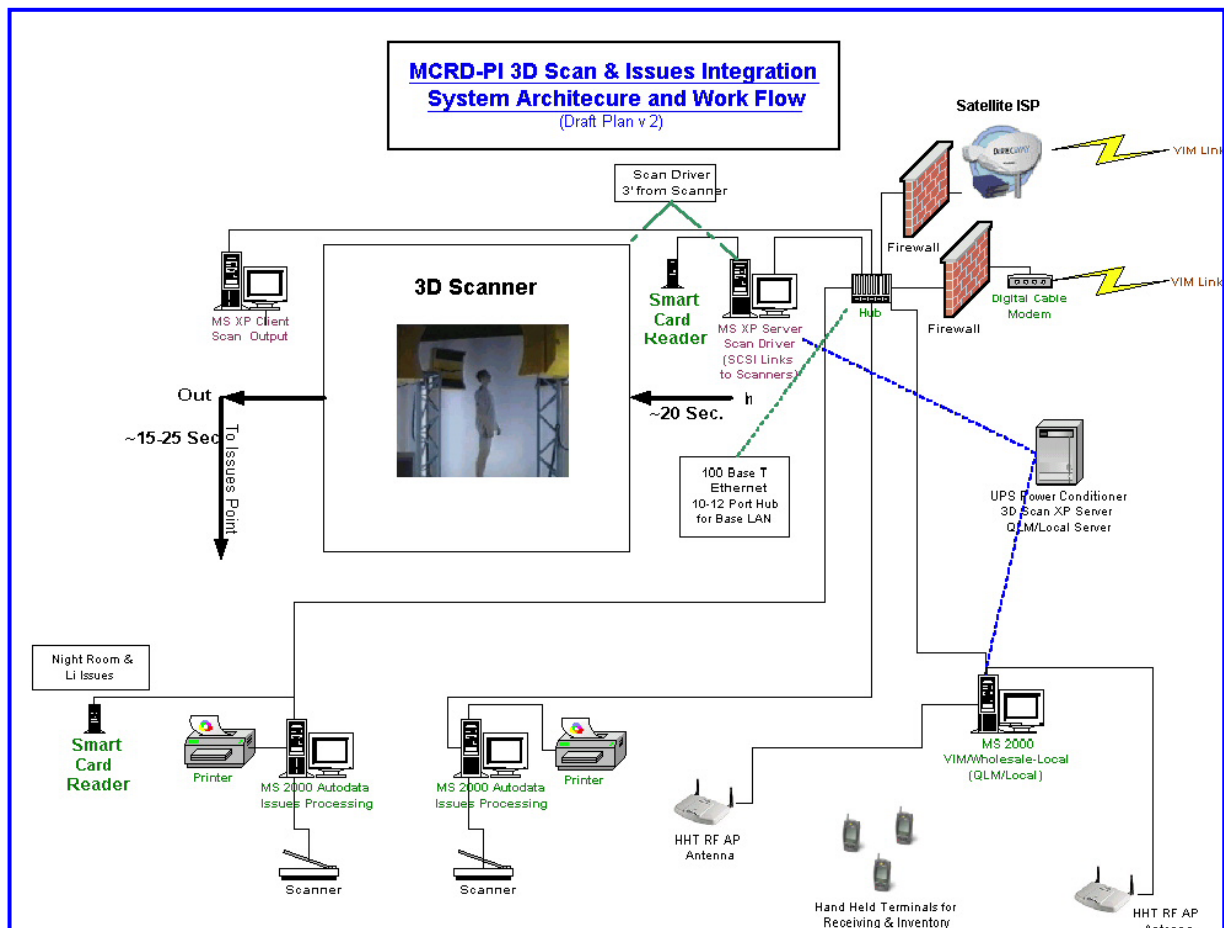
Figure 1 – MCRD-PI Systems Architecture and Work Flow

As shown in Figure 1, the Smart Card reader is the first data source in the issue process. When the recruit's Smart Cards are scanned, the recruit's identification data is captured. Subsequent to this, the recruit's issue record is created in the Control Panel and the night room issue forms are prepared. These forms are collected and scanned using a commercial-off-the-shelf (COTS) product (AutoData Scan Form System) and the ARN Control Panel software. This data is pulled up to the ARN Server at AdvanTech every 15 minutes updating the VIM Wholesale Local, Suggested Order List.

Also shown in Figure 1, the Phase II issue process begins with a swipe of the Smart Card. The recruit's identification data captured during this card swipe is used to populate the Phase II issue form with the correct social security number and requisition information. The Phase II issue form is then printed, marked to indicate the sizes issued to the recruit, the form is then scanned and as mentioned above the issue data is captured every 15 minutes and a new VIM Suggested Order List is calculated based on these issue transactions.

> **Note:** AdvanTech added an interface between the Cyberware 3D Whole Body Scanning Software and the recruit database in the Control Panel. A file of the recruit identification data is imported into the Scanning Software, the operator of the Cyberware system selects the recruit's name from a drop down list that populates the recruit input information in Cyberware's size selection software, Digisize. The recruit is then scanned in the 3D Whole Body Scanner, and the recruit's measurements are converted to sizes and passed to the Control Panel where a size specific issue form is created.

Receiving data is also captured through a radio frequency network and hand-held terminal application. As receipts are processed at the warehouse receiving area, data is pushed from the HHT to the ARN local server. Every 15 minutes this data is pulled up to the ARN Server at AdvanTech, updating VIM Wholesale Local, and providing data on which to create the Suggested Order List, which is submitted to the Defense Supply Center Philadelphia (DSCP) SAMMS system twice a day.

Figure 2 illustrated below depicts the physical layout of the network employed at MCRD-PI. The wireless network is used to tie together both HHTs and workstations in each building to a hub that is connected to the wireless access point. (The wireless access point is a conduit from the "wireless" devices to the fiber optic cable.) MCRD-PI provided the fiber optic cable that connects the Female issue point, and Night Room issue point, to a multiple port switch used to route data and transactions to the local ARN server. Ethernet cable is used in the Male Phase II issue area to connect the wireless access point to the switch.
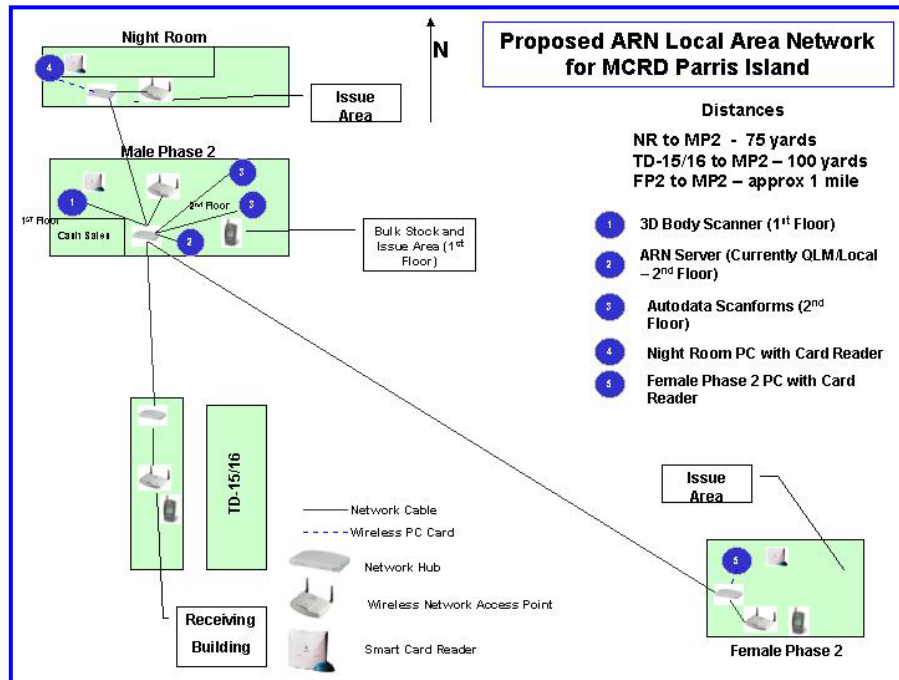
Figure 2 – MCRD-PI ARN Local Area Network.

Note: No fiber or Ethernet cable was in place to connect the warehouse/receiving areas to the ARN network. AdvanTech resolved this problem by implementing a line of site RF solution whereby one access point was installed in the main warehouse building with an antennae placed on the outside of the warehouse building. A second wireless access point was installed on the main clothing building with an antennae placed on the outside of the building. The signal from the warehouse "hops" from the warehouse antennae to the main building antennae and the transaction is then transmitted across Ethernet cable to the switch.

1.5   Implementation

The implementation of the integrated solution began in July 2002 with the programming of the web-based VIM/Wholesale Local. At the same time the HHT functionality was expanded. The physical implementation began in November 2002 with the installation of the router, server, switches and RF network installations. The network was completed in March 2003 with final router modifications and security enhancements. The integration of the size data from the 3D Whole Body Scanner was finalized and tested in April 2003. The remaining VIM/Wholesale Local functionality of physical inventory and supplemental bin location label reports from the

web-based system was completed in December 2003. This implementation schedule is illustrated in the following Figure 3 – MCRD-PI ARN Project Completion Timeline.
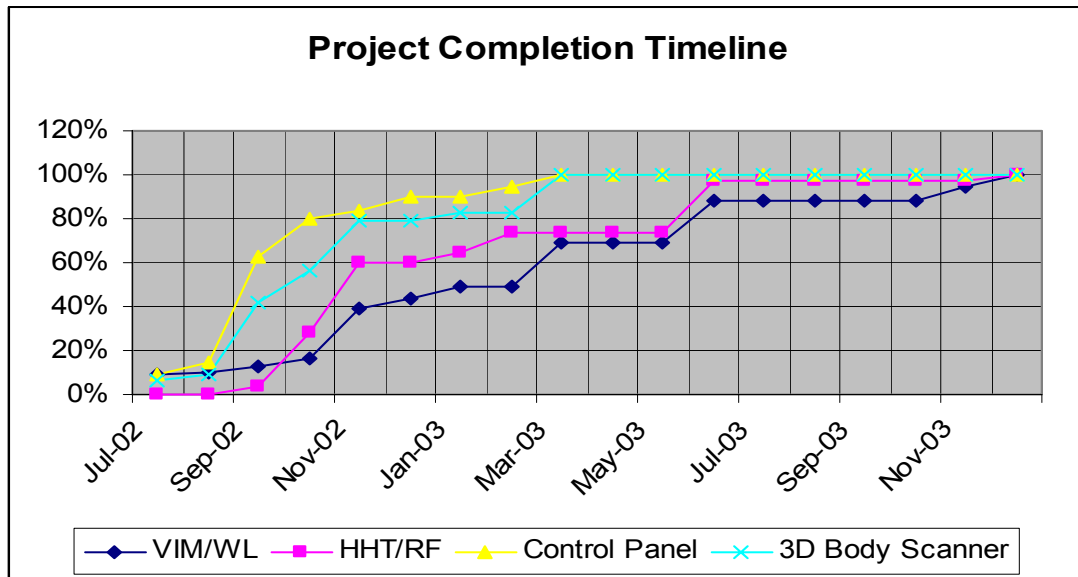
Figure 3 – MCRD-PI ARN Project Completion Timeline

1.6   Summary of Lessons Learned

As with any new system, there were numerous difficulties and issues encountered that had to be resolved as efforts progressed. The following items highlight the key lessons learned that needed to be considered for future rollout efforts of this fully automated supply chain management solution:

➢   **Buy-In by site personnel requires local champion(s) –** Support and management direction by local champions for new systems – while not ensuring successful implementation – significantly strengthen successful acceptance of new processes and applications.

➢   **Network and security setup –** Systems architecture must be carefully defined to ensure all components are located and linked for effective operational support including security of systems. This project highlighted the need to provide full plans for installation support without reliance on site personnel. Site requirements for network infrastructure should be coordinated with site personnel but handled separately to ensure needs are met accurately and efficiently.

> ➢ **Modification of site's procedures and training –** As new systems are introduced such as scan forms and use of hand-held terminals in this project, a key step is the redesign of workflow and operational procedures to introduce and train staff in the use of the new systems. Carefully planned and executed training is critical to having personnel adapt to the use of new systems and procedures.

> ➢ **Support for physical inventory process –** With the introduction of these new systems, there is a need to conduct physical inventories. Formal inventories were conducted semi-annually prior to conversion to "wholesale local" operations. Following conversion to the new systems, representatives from AdvanTech and DSCP should be on-site – especially for the first inventory – to assist with the new VIM/WL application and the new hand-held programs.

> ➢ **3D Body Scanner use –** This new system and approach requires special attention to ensure minimal anxiety from staff and recruits during routine activities. Keys to ensuring effective implementation and acceptance include modified procedures for issues processing, briefings of operational staff and use of training aids (e.g., photos and diagrams) showing proper positioning and use of the equipment to optimize results achieved.

1.7   Summary Objectives & Results Achieved

There were several objectives defined at the start of this project including the following:

> ➢ Provide enhanced accuracy of on-hand balances and asset visibility of current stock positions;

> ➢ Decreased Order Ship Time (OST) through support of real-time processing of materials received to enhance accuracy and facilitate stock replenishment;

> ➢ Improve Physical Inventory accuracies and efficiencies through reduction in errors in routine issues and receiving activities as well as enhanced physical inventory processing;

> ➢ Improve effectiveness of Phase II Uniform Male Issue Process with accurate recruit identification and faster forms processing; and,

> ➢ Develop use of 3D Body Scanning technologies for issue processing including capturing data for updating/refinement of sizing data tables.

As a result of the project, the inventory discrepancy loss rate experienced using ARN's Virtual Item Manager/Wholesale Local (VIM/WL) systems for the last MCRD-PI inventory was slightly less than 5%. Before these new integrated programs, the inventory loss rate was at 10%. Further, the order ship time OST was reduced from approximately 13 days to approximately 8 days.

The Phase II male issue process successfully incorporated the use of the Cyberware 3D Whole Body Scanner for nearly 100% of recruits. The data captured can now be used to update sizing data tables to increase accuracy achieved by using the scanner in the future – both at MCRD-PI and future sites.

These changes and enhancements have contributed to ensuring that recruit issues are accurately recorded without adversely affecting MCRD-PI's performance standards during recruit issues, DSCP Item Managers have better production requirement data, and wholesale-local inventory requirement predictions are more accurate with reduced inventory levels required. Following completion of this project, support has been extended and refinements continue to be made to fine-tune operational support and efficiency of the supply chain activities.

In conclusion, the fully automated supply chain management system now provides MCRD-PI with a Wholesale Local inventory management system that updates inventory data within 30 minutes as opposed to 1 – 3 days previously provided with the QLM/Local system. The new system ties all 6 buildings/area of the Clothing Branch together in one cohesive network for managing clothing inventory replenishment and issue activities.

This project has provided DLA and DSCP a real-time look at the inventory position extended to the point-of-issue to the recruit, the ability to monitor and manage the inventory adjustments being submitted by MCRD-PI, and a more accurate picture of the "Total Asset Visibility" of the items issued at MCRD-PI. With that information, the DSCP Item Managers have the data to more accurately predict the supply requirements and contracting lead-time surrounding the MCRD-PI stock.

2.0   VIM Wholesale Local

VIM/Wholesale Local (VIM/WL) is the web-based interface that provides a common user interface for MCRD-PI Clothing Division personnel for the daily warehouse and inventory management business activities and provides a common user interface for DSCP personnel providing oversight and direct management control over transactions at MCRD-PI that affect inventory results. VIM Wholesale Local is the replacement solution to the QLM/Local materials management system.

The Quality Logistics Management (QLM™) Client/Server System (QLM-C/S), which constitutes QLM/Local, was installed and operational at MCRD-PI. The implementation of QLM/Local at MCRD-PI initially provided only one workstation. All transactions (receipts and adjustments) generated in QLM/Local were held and batched into the ARN Supply-chain Transaction Repository Audit (ASTRA) system on a daily basis. ASTRA then validates the MILSTRIP transactions before they are accepted into the data queue. Then the data then is processed/transferred into the DSCP SAMMS system (typically taking between 24 and 72 hours) before the data in VIM was updated. Table 1 summarizes function additions and enhancements that were instituted to upgrade/migrate the ARN system functions at MCRD-PI from QLM/Local to VIM/WL.

Table 1 – QLM/Local to VIM/WL Upgrade/Migration

Function Priority Group	QLM/Local	VIM/WL	Remarks
First	Stock Catalog	Stock Catalog	Enhanced with NSN search capability.
First	Supplemental Bin Locations	Supplemental Bin Location Management	Enhanced to allow unlimited number of locations.
First	Receipt Processing (View DSCP Receipts, Process DSCP Receipts)	Receipt Processing *(View DSCP Receipts, Process DSCP Receipts)*	Migrated functionality
First	Purchasing (View DSCP Requisitions, View Open DSCP Requisitions)	Purchasing *(View DSCP Requisitions, View Open DSCP Requisitions)*	Migrated functionality
Second		Due Member *(View Due Member, Modify Due Member, Close Due Member)*	New Function

Function Priority Group	QLM/Local	VIM/WL	Remarks
Second		Audit Data Management *(Add/Update User Information, Add/Update Phase Information, Add/Update Form Information, Add/Update Recruit Activity)*	New Function
Second	Inventory Reconciliation	Transaction History	Enhanced to allow for NSN search and display sorting.
Third		Total Asset Visibility	New Function
Second		View Issues	New Function
Second	Process Returns and Exchanges	Process Returns	Migrated Function
Second	Process Returns and Exchanges	Process Exchanges	Migrated Function
Third	Receiving Report	Receiving Report	Migrated Function
Third		Stock Movement Report	New Function
First	Inventory Adjustment Report	Inventory Adjustment Report	Migrated Function
Third	Stock Status Report	Stock Status Report	Migrated Function
Second		Replenishment Report	New Function
Second		Quality Deficiency Report	New Function
Third	User Reports	User Reports	Migrated Function

2.1   Overview of System Architecture

VIM/WL operates on an SQL database and uses Active Server Page (ASP) for the user interface. The ARN server at the AdvanTech corporate office has both scheduled tasks and data transformation services (DTS) programmed to query the MCRD-PI ARN Server every 15 minutes via a secure VPN tunnel/connection.

Two updates occur with the MILSTRIP transaction files for issues (A0A), receipts (D6K or D6Z), and adjustments (D8A or D8B). VIM's Wholesale Due-In table is updated with new data as it is received. This provides both the site and DSCP Item Managers with very near-real-time data. This, in turn, updates MCRD-PI's Suggested Order List (SOL), which is updated with

each update to the Wholesale Due In table.   The second major update is to the SAMMS system. As the MILSTRIP transactions are pulled from MCRD-PI, the transactions are processed through ASTRA and transferred by FTP to the DSCP SAMMS system.

Transactions produced by the HHTs are text files that are picked up every 15 minutes in much the same way as mentioned in the above paragraph. To update the HHT with the latest Due-In data, updates to several Paradox tables are made on the ARN Server at AdvanTech. These tables are then pushed to the ARN MCRD-PI Server. When the HHTs are turned on and a function is selected (receiving, stock movement or physical inventory), the "local" Paradox tables are queried and uploaded / transferred to the HHT making the data request.

2.2   Scope of the Task

As shown in Table 1 above, AdvanTech prioritized the functions in QLM/Local based on the most essential elements needed for the VIM/WL system rollout. Functions that were necessary for the normal day-to-day activities of inventory management at the Recruit Training Center and the data transformation services (DTS) were categorized as first development priority. Reports and management data fell into the second priority group, and the functions surrounding the physical inventory process and improvements on data displays were in the third priority group.

With that knowledge, AdvanTech began the development of the VIM/WL modules. In total seven (7) new functions were developed, eight (8) existing QLM/Local functions were migrated to VIM/WL, and three (3) QLM/Local functions were modified and migrated to VIM/WL. In this manner, AdvanTech was able to turn QLM/Local off and rapidly implement VIM/WL while providing additional functionality through incremental releases as shown in the following Table 2.

Table 2 – Incremental Function Release

Month/Year	Function
September 2002	Stock Catalog and Supplemental Bin Location tables and programs testing continued
October 2002	Exchange and Returns Program
December 2002	View DSCP Receipts, Process DSCP Receipts View DSCP Requisitions, View Open DSCP Requisitions
December 2002	Process Inventory Adjustments
January 2003	Completed the View Credits program related to processed exchanges and returns
February 2003	Completed the Recommended Replenishment Report and the Stock Move Report

April 2003	Completed the User Reports
March 2003	Designed the QDR and Due Member modules and completed programming on Transaction History, Total Asset Visibility, 3D Body Scanner Validation Report, User Access, and Cost Center for Stock Movements
December 2003	Completed Physical Inventory programs and windows

2.3   VIM/WL Objectives

The underlying principle of the fully automated supply management system is to migrate towards a real-time system and in so doing provide up to the minute inventory data to item managers. This inventory data in turn provides item managers with the information upon which they can make decisions affecting contracting requirements, and redistribution priorities to the retail organizations.

The objectives of the VIM/WL portion of this Short Term Project (STP) and project proposal leading to this FTR included:

> ➢ Converting from the Paradox client/server QLM/Local system to an on-line real-time or near real-time application accessible via the ARN Virtual Item Manager (VIM) application suite;

> ➢ Eliminating the nightly batch processing from QLM/Local and use of near real-time data transfer services and scheduled tasks to capture and process data; and,

> ➢ Reducing the time that MCRD-PI expended on nightly processing through a cumbersome and unreliable dial-up modem.

Each of these objectives was accomplished during the project support. The QLM/Local system architecture was upgraded to the VIM/Wholesale Local architecture and integrated to the VIM application suite. Nightly batch processing was eliminated and processing improved to provide real-time/near real-time (function dependent) access to data (information related to local activities is updated real-time while information that must be processed through remote systems, i.e., SAMMS, is provided in near real-time).   Finally, communications linkages were upgraded from the dial-up modem previously used to use of a cable modem with service provided through a local Internet Service Provider (ISP).

3.0   RF Network and Applications

The RF Network and the HHT applications were developed and implemented for several reasons. First, the RF Network expands and extends the "wired" portion of the network relatively inexpensively. With insertion of a wireless card in a computer, the need for extending cable for a network drop is eliminated. Once the RF network extends to a particular area/building, greater flexibility over placement of workstations and modification of any processes/procedures is attained. Second, the implementation of the RF Network was to provide for a faster and more accurate receiving process that could reduce the overall DSCP order ship time (OST) for MCRD-PI. Third, the enhanced data visibility and access to programs with the RF Network was to give the users a means of tracking stock as it moved from a bulk location to other storage or issue location. And last, the HHTs and RF Network were to provide faster access to data and more accurate physical inventory processes.

Three HHT applications were developed/implemented that improved the receiving, physical inventory and movement of stock. These modules are the Receiving, Physical Inventory and Stock Movement programs.

Warehouse personnel can use a HHT to process receipts and have all of the historical data at their fingertips if discrepancy research is required. The Stock Movement application provides for a tracking mechanism of stock moved from one building to another or from bulk locations to issue locations. The physical inventory program allows for the capture of National Stock Number (NSN) and quantity counts by location with the HHT and automatic upload of the data to the server without the need for a clerk to type in the results from a count sheet.

These applications were implemented with moderate success. The Receiving program was popular and used quite successfully by most warehouse personnel. Use of the program is dependent of availability of HHT to process using this function – if someone does not have HHT, he/she can use terminal for receipt processing function. Also, some operators had difficult with the size of the data displayed on the screen of the HHT and preferred to use a terminal due to the size and brightness of the information that can be displayed in the warehouse receiving area where lighting may be sub-optimal.

MCRD-PI personnel tried to use the Stock Movement application but found that unless they were decrementing stock in a location and then incrementing stock levels for a location, the program was not really helping them track and prevent storage location problems. The warehouse personnel and the night room personnel use the Physical Inventory HHT program to perform the semi-annual inventory. The Male Phase II and Female issue areas use the manual count sheets to record inventory counts, which are passed to a clerk for data entry into VIM. Some personnel have trouble reading the small screen on the HHT which is one reason all personnel are not using the RF applications.

> **Note:** The current operational configuration of the VIM/WL is identical to that of
> QLM/Local. Stock is not tracked by quantity in location. There is only one
> quantity tracked for all maintained locations. The stock movement program will
> be effective only if this operational configuration is modified, and the software
> enhanced with the ability to track additional information including stock location
> capacity and possibly lot number information if required to ensure stock rotation
> or lot number tracking for quality control.

3.1   Overview of System Architecture

The HHT solution is a radio frequency networked solution that requires a server component, a hand-held component and database tables used to store data for transmissions from the ARN server at the AdvanTech, Inc. corporate office. The server component is a Visual Basic program that acts as a conduit between the database tables and the HHT program. This server component (ARN RF Server) tracks the session properties of each HHT requesting and sending data.

The HHT component is based on programs developed for the Palm^{TM} operating system. Data is received and sent by the HHT in the form of text strings. These text strings are routed to the MCRD-PI ARN Server, where they are picked up every 15 minutes and processed for display in VIM/WL and transmission to SAMMS. Updated due-in data and stock catalog data is populated to Paradox tables on the ARN server at the AdvanTech corporate office. Updated tables are sent to the MCRD-PI ARN server every 15 minutes. These updated tables contain the data that is sent in the form of text strings to the HHT.

There are also four levels of security implemented across the wireless or RF network. AdvanTech first implemented machine address code (MAC) filtering for security. This is a setting established on the wireless network access points (WAP). If a device tries to access the wireless network, the access point checks the devices MAC address and refuses unregistered addresses. The second level of security is through the use of ESSID. This is a setting on the WAP that must be matched exactly by each device trying to gain access to the wireless network. AdvanTech established the ESSID code on the WAPs, the HHTs, and the wireless PCMCIA cards. The third level of security is through WEP 128 bit encryption techniques. Again a unique key is programmed into the WAPs and each device on the wireless network. And lastly there is password control into the ARN Palm applications.

3.2   Scope of the Task

A complete survey was performed of all MCRD- PI buildings and areas where recruit clothing is received, stored and issued. Six wireless network access points were installed and five HHTs were provided to the site. This configuration (as shown in **Figure 4 – Radio Frequency Topology at MCRD-PI** below) provided 100% wireless coverage in the Clothing Branch.

The receiving program was the only RF application developed before the start of this project. Enhancements to this module were required in order to provide the receiving clerk with the data needed to process partial receipts and/or receipts for supplemental shipments without suffix codes.
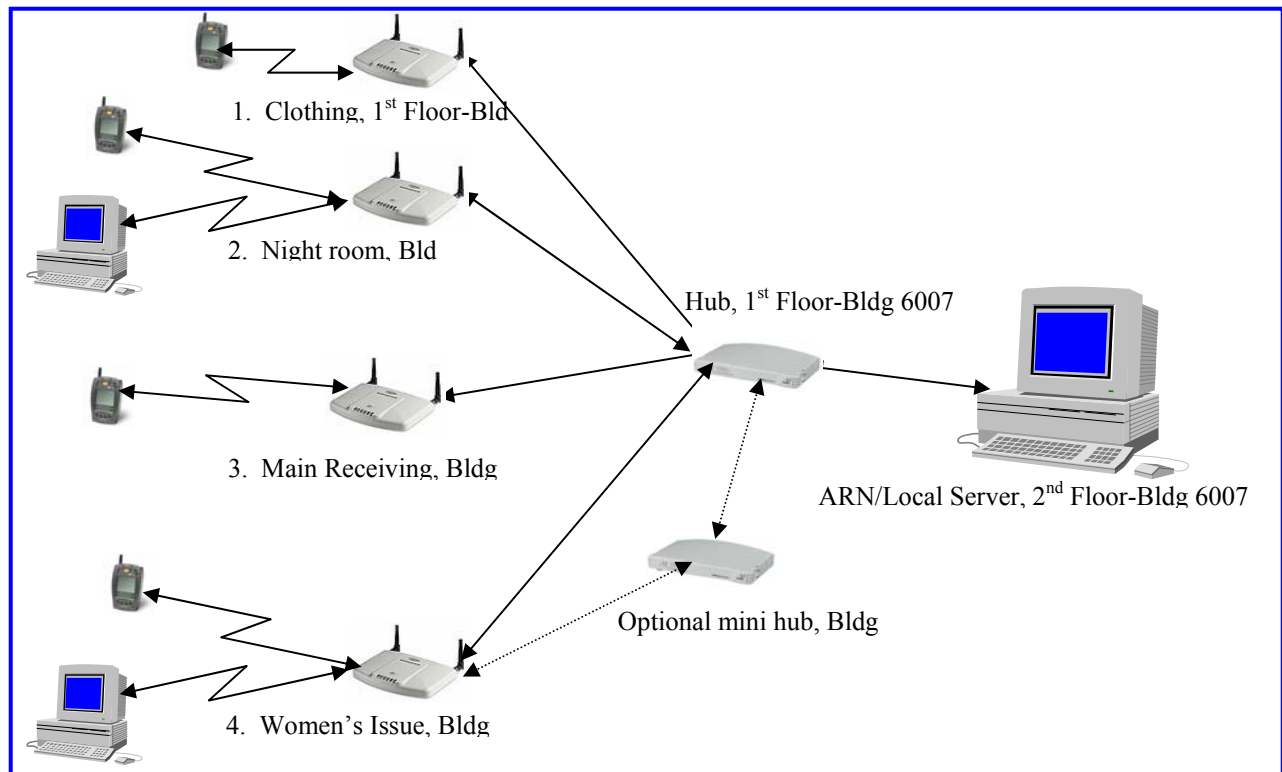
Figure 4 – Radio Frequency Topology at MCRD-PI

The receiving program uses the recduehht.db. The recduehht.db provides the document number, NSN, original quantity of order, remaining quantity due-in, average daily usage, quantity on hand, and last suffix code used. The complete due-in file is downloaded to the HHT. Once the receiving clerk scans the document number, all of the data associated with that document number is displayed on the HHT receiving screens.

The stock movement program was a module developed for this STP. The module required the use of the following Paradox tables: costcen.db, stockmoves.db, mastcat.db, and stockcat.db. The costcen.db table is used to identify the warehouse or issue area where stock is moved from or to. The stockmoves.db is a new table that tracks the area sending stock and the area receiving stock, the NSN sent and the quantity sent and received. The mastcat.db is used to

capture the NSN and the item description. The stockcat.db is used to identify the bin location, and bulk locations.

The physical inventory module was designed to provide the user with greater flexibility to count multiple packaging types and quantities and to provide a greater accuracy in the inventory count by directing the user to each location in the warehouse sequentially. The program also allows MCRD-PI personnel the functionality of picking-up NSNs not on the HHT count file. All of this new functionality is intended to insure more accurate semi-annual inventories.
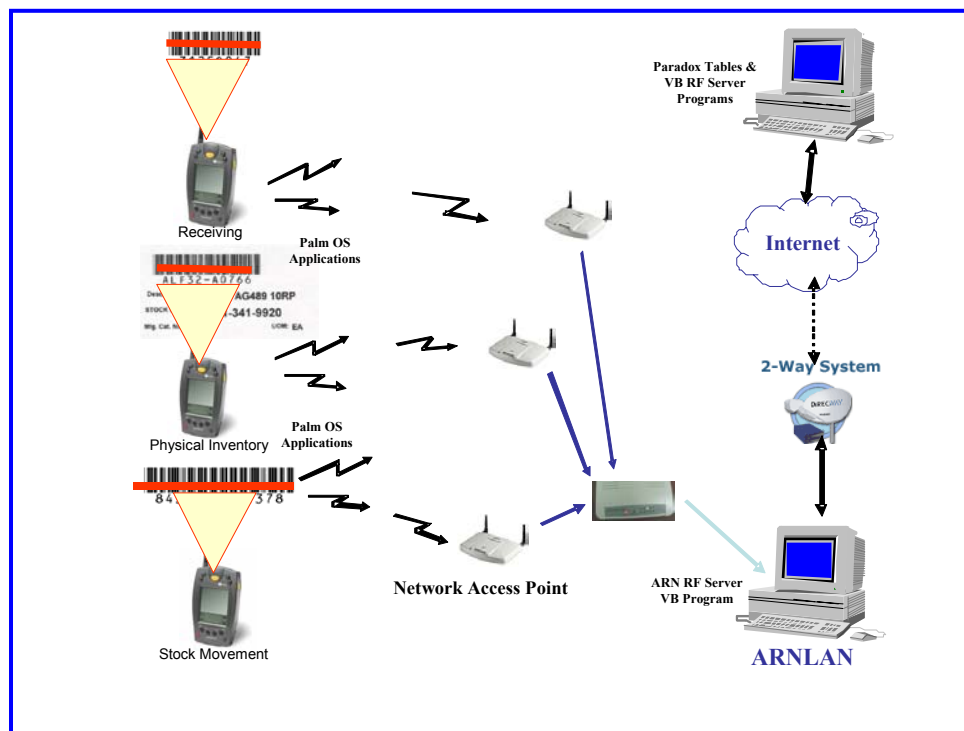
Figure 5 – ARN Receipt, Movement & Stock Movement Modules

3.3   RF/HHT Objectives

The objectives of the RF/HHT portion of this Short Term Project (STP) and project proposal leading to this FTR included:

- ➢   Installation of a wireless network with 100% coverage in all issue, receiving and warehousing areas;

- ➢   Provide a more efficient receiving process and thereby reduce the OST;

➢   Implement a stock movement and physical inventory process that eliminated the manual keying errors of the previous system and provide a more accurate inventory count; and,

➢   Incrementally develop and implement Radio Frequency network functions and features to support VIM/WL.

The project support achieved each of the above objectives with the implementation of the wireless network using RF capabilities to link users to the VIM/WL functions for receiving, physical inventory and stock location functions.

The exception was that the stock movement program required additional effort for the operator to enter both the location being decremented as well as the location being incremented. As a result, the program increased data entry requirements and did not really help track and prevent storage location problems. Accomplishing this objective would require significant enhancement to the software to provide automated support for stock movement functions including 1) order receipt/stock put-away processing; 2) maintaining stock location cubic storage capacity and current use; and 3) stock picking routines to track and capture all current active stock locations (and first-in/first-out movement of lots to ensure stock rotation).

The systems introduced provided automated data entry and reduced manual keying and resulted in improved data accuracy, reduced Order Ship Time and enhanced visibility of inventory and stock receiving information. Dates for completing activities related to the accomplishment of the above objectives are provided in the following table.

Table 3 – Radio Frequency Development & Implementation

Month/Year	Function
July 2002	RF Survey Complete
October 2002	RF Network Installed
November 2002	Programming of RF Physical Inventory and Stock Movement programs
December 2002	Training on RF inventory module and implementation of modified RF Receiving programs.
February 2003	Modifications to RF Stock Movement and Physical Inventory programs
March 2003	WEP 128 bit encryption was established on the RF network along with MAC address filtering
November 2003	Completed the RF Server controlling software
December 2003	Completed the Physical Inventory module

4.0 Improved IRM Control Panel, Scan Forms and Smart Card Reader Interface

The ARN Control Panel application is a tool that is used to capture detailed issue data for Defense Supply Center, Philadelphia. The ARN Control Panel is used to capture issues made to both male and female recruits at MCRD-PI. In order to accurately capture the issue data and subsequently decrement on-hand quantities, the AutoData Scan application has been programmed to track issues made to recruits by tracking the social security number, platoon number, stock number, quantity issued and date issued as an individual issue file. This data is then used to decrement each line item of supply issued to a particular recruit within a specific platoon on a specific day and thus provide an audit trail of transactions.

The ARN Control Panel was operational prior to the start of this STP. However, the forms and some of the processes were problematic for the site. The forms required recruits to write their social security numbers, platoon numbers and regular/reserve component in designated boxes, and when the forms were scanned, the AutoData scanning software attempted to interpret the handwriting on each form. Often the numbers were illegible and required the clerk performing the scanning process to guess at the correct number. And at other times the AutoData system would interpret the handwriting incorrectly.

In order to combat this problem, this project took on the challenge of automatically capturing the recruit's identification data from his/her Smart Card, and populating the scan form with the social security number, platoon designation and active/reserve component. This meant a redesign of the issue forms and the development of a program that could read the data from the Smart Card. Additionally, it was decided to actually build the Recruit Master table from the data on the Smart Card solving the dilemma of interfacing to the Marine Corps RASPAS system to capture incoming recruit data.

Another problem the site was experiencing with the previous version of the ARN Control Panel centered on the lack of an archiving feature of the issue file. The size of the issue file was degrading the responsiveness of the Control Panel. Developing a program to archive recruits' records upon completion of Basic Training would alleviate this problem.

4.1   Overview of System Architecture

The ARN Control Panel incorporates relational data base design functionality while the Smart Card reader program is accomplished with Microsoft Visual Basic. Figure 6 below outlines the steps required for creating the Recruit Master Table for each platoon, starting at the Night Room, and perpetuating the data for use in Phase I and Phase II issues (see **Figure 6 – Recruit Master Table Creation**).
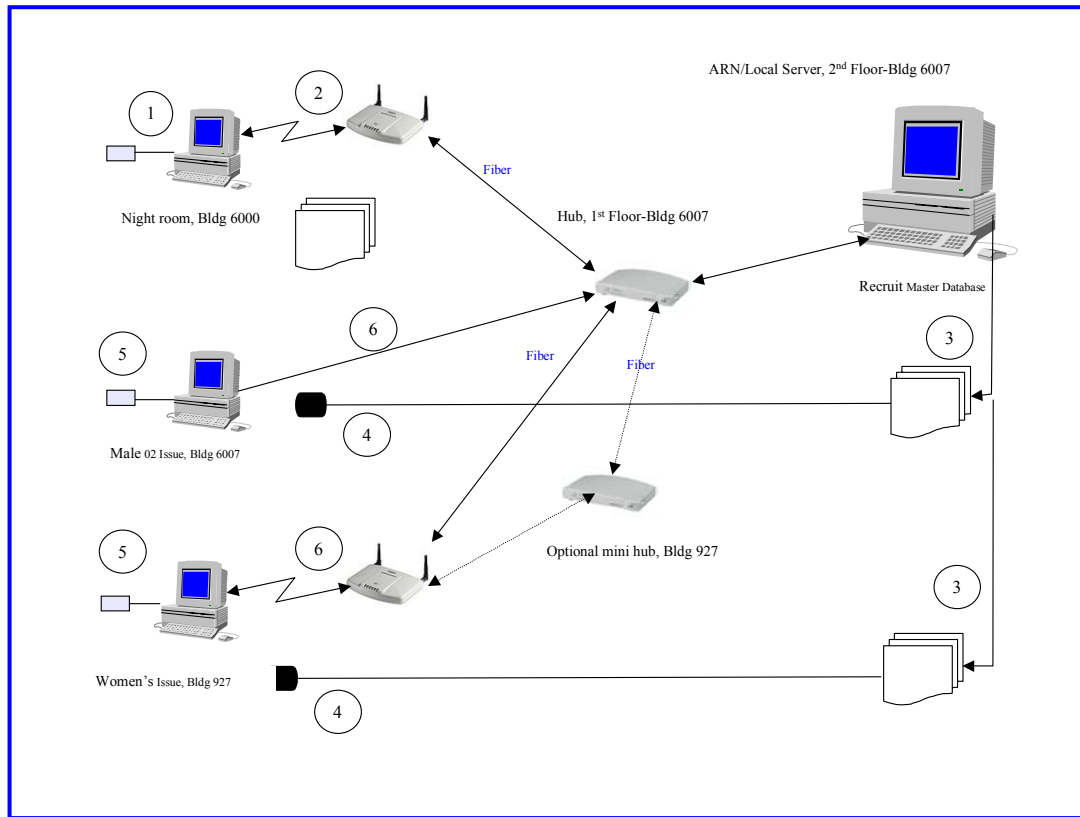
Figure 6 – Recruit Master Table Creation

The following describes the sequence of activities completed in the Recruit Master Table Creation process:

1. Read smart card and produce bar coded scan forms.
2. Recruit data file sent to ARN/LAN server and stored.
3. Recruit data used to create bar coded scan forms to specific platoons prior to a Male or Female 02 Appointment.
4. Pre-printed bar coded scan forms moved to Male or Female 02 Issue Point.
5. The card reader is used to create scan forms for recruits who have been transferred into the platoon since the roster was created at the 01 Appointment.
6. Updated recruit data is transmitted back to the server to update the recruit database.

4.2   Scope of Task

The scope of the project entailed different elements including the following: 1) A complete redesign of all scan forms was required in order to create bar coded scan forms; 2) A Smart

Card Reader program had to be developed; and, 3) The ARN Control Panel was modified to incorporate an archiving program. These activities are described in the following table.

Table 4 – ARN Control Panel Modification and Implementation

Month/Year	Function
August 2002	Reformatting of scan forms incorporating bar coded fields for personal information. Also completed modifications to the data conversion and data editing processes.
September 2002	Developed Smart Card program
September – October 2002	Setup Smart Card Reader and Control Panel in the Night Room
October 2002	Added an Archive function to the Control Panel
January 2003	Implemented the new scan forms and modified Control Panel
April 2003	Implemented Phase II Male Forms with Predicted Sizes

4.3   Improved Scan Form/Control Panel Objectives

The objectives for the improvements to the scan forms and the control panel operations included the following:

➢   Eliminate the need for recruits to write their social security and platoon numbers by redesigning the forms to incorporate bar coded fields containing this data.

➢   Incorporate a Smart Card reader application to capture a recruit's identification data directly from the card.

➢   Make the process of scanning the forms more user-friendly by eliminating the problematic handwritten form information.

Each of the above objectives was achieved through the improvements made to the issues scan forms and the ARN Control Panel. Some difficulties were initially encountered with incorporating the Smart Card into the processing (access to and interpretation of data encrypted on the card to generate data for scan forms), but these issues were successfully overcome.

5.0   Electronic File Management System

CabinetNG^TM is the commercial off the shelf (COTS) electronic file management system used for the fully automated supply chain management system at MCRD-PI. The intent of fielding an electronic file management system was to provide MCRD-PI personnel with a product that would easily file all scan forms and make scan form retrieval an easy and efficient process. This is illustrated below in Figure 7 – Electronic Filing of Recruit Issue Forms.

An interface between the ARN Control Panel and CabinetNG was developed which would automatically file forms after they were scanned. Forms are filed by platoon numbers and then by the last four digits of the recruit's social security number and last name. This provides for the easiest possible retrieval of a specific recruit's issue data.

At MCRD-PI, the CabinetNG is accessed most often by the night room/Phase I staff during the exchange process. When a recruit attempts to exchange any Phase I item, his or her platoon and social security number are researched to determine if the size being exchanged is in fact the size issued to the recruit. If the sizes do not match, the recruit is sent back and the Drill Instructor is notified.
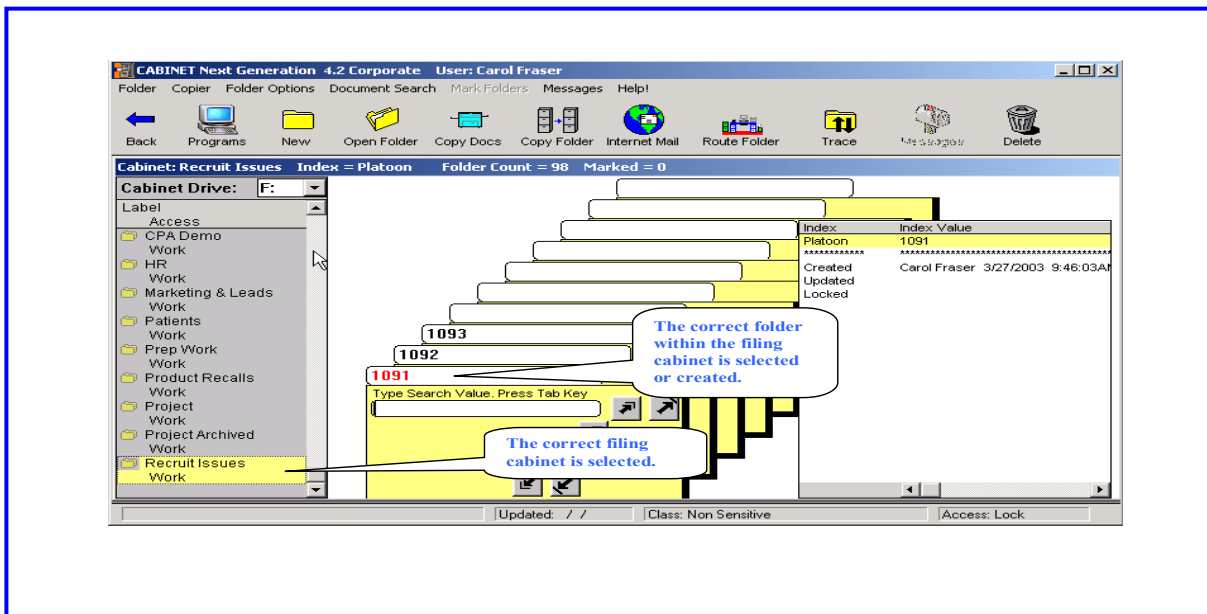
Figure 7 – Electronic Filing of Recruit Issue Forms

5.1   Architecture

The electronic file management system is both a commercial off the shelf (COTS) product as well as a custom interface program developed. The electronic file management system, CabinetNG™ and the custom interface were developed by ePaperless. The database for CabinetNG is a proprietary database structure. A five-seat license was purchased with one copy on each of the two scan stations, two print stations and one copy for the female issue area. As illustrated in the following, all scanned forms are saved to a designated drive on the server, and all five (5) workstations point to that shared drive to access the "filed" images (see Figure 8 – Scan From Creation and Electronic Filing).
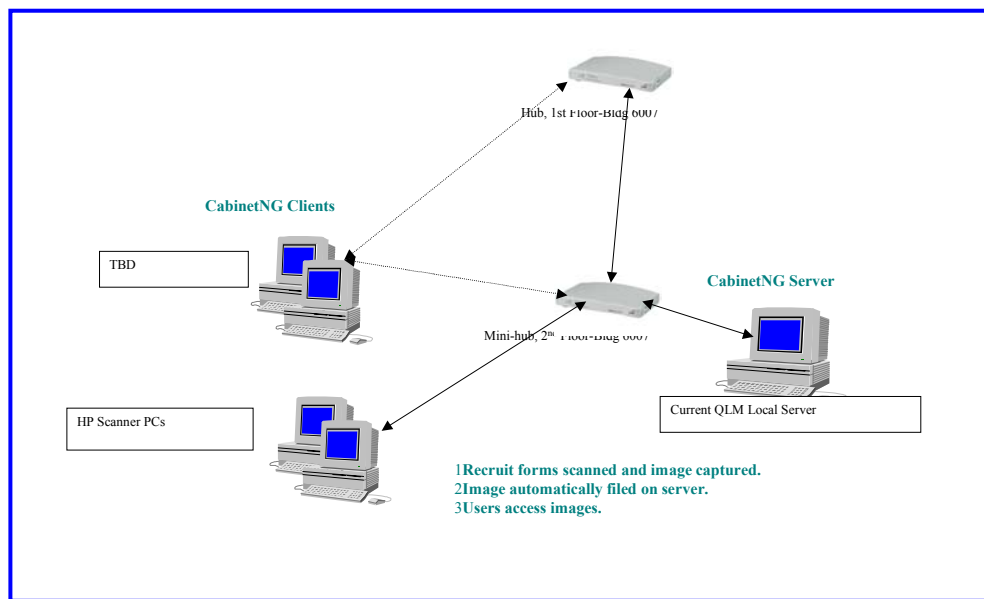
Figure 8 – Scan Form Creation and Electronic Filing

5.2　Scope of the Task

This particular task was a relatively simple process. AdvanTech was required to modify one table in the ARN Control Panel. Specifications/requirements for the interface were provided to the CabinetNG vendor for the programming of the interfacing application. CabinetNG installation and modification schedule was as outlined in the following table.

Table 5 – CabinetNG Installation and Modification Schedule

Month/Year	Function
November 2002	CabinetNG software installed.
December 2002	Designed Interface between Control Panel and CabinetNG
March 2003	Installed the interface software between the ARN Control

Month/Year	Function
	Panel and the CabinetNG program (developed by CabinetNG).
March 2003	Modification to Control Panel's Recruits database made to capture scanned image name and location. This modification was required for the interface.

5.3   Electronic File Management Objectives

The objectives of the Electronic File Management portion of this Short Term Project (STP) and project proposal leading to this FTR included:

➢   Providing users with an automatic filing mechanism of all scanned forms; and,

➢   Provide an efficient retrieval process of all recruits' issue forms.

Each of these objectives was achieved. Users now use the electronic file management capabilities as a routine part of daily operations and can easily and efficiently retrieve recruit issue form records when needed.

6.0   3D Body Scanner Integration

The 3D Body Scanner integration is essential for the fast and efficient processing of male recruits through the Phase II issue process. Additionally, sizing data captured during the scanning process is stored for eventual use by DSCP. This data can be used to adjust clothing patterns to adapt for the demographic sizing challenges faced by the Marine Corps Recruit Depots.

The leadership of both the Officer-in-Charge (OIC) and Non-Commissioned Officer-In-Charge (NCOIC) were key to the successful implementation of the 3D Body Scanner. The MSgt (NCOIC) organized the phase II process to take full advantage of changes in the issue line procedures. Specifically, to overcome the added 30-second processing time through the scanner and the wait time for recruits in line to be scanned. This "wait time" was transformed into the shoe and head measurements. By so doing the recruits did not experience a down time during the issuing process.

Additionally, the Clothing Branch, MCRD-PI requested and received a change to the overall recruit training schedule. This change was approved by the MCRD-PI commander and allows for the scanning and issuing of clothing much later in the training cycle and giving the Clothing Branch a full 8-hour issue day for recruit processing. This is a 2-hour increase in the time allotted for the phase II issue. The change in the schedule providing Phase II uniform issues later in the recruit training schedule also resulted in fewer uniform alterations and/or exchanges being required. This was because the recruits had achieved greater stability to their stature and physique as a result of additional training time prior to the Phase II issue processing

There have been some concerns regarding the accuracy rate of the 3D Body Scanner. For instance, the accuracy rate for the prediction of the green sweater is below 20%, the green coat is less than 50%, and the long sleeve shirt is less than 70%. These percentages are well below the expected 85% rate found at MCRD-San Diego. In an effort to adjust for these lower percentages, the scan forms were designed to accommodate the predicted size plus 8 additional projected sizes. Despite this change, there is some concern by the MCRD-PI fitters that the scanner is not as efficient as manually measuring each recruit.

6.1   Architecture

The Cyberware 3D Body Scanner integrated solution consists of 2 Windows XP workstations running the Cyberware DigiSize software and the Body Scanner. This system is linked to the ARN VIM/WL using AdvanTech's Perl script to convert measurement data to NSNs, and a Visual Basic program integrates the recruits' sizes and identification data into the ARN scan forms for a recruit specific issue form with predicted sizes. The architecture for integration of the Cyberware 3D Body Scanner into the ARN systems is illustrated in Figure 9 – Whole Body Scan & Generation of Size Data.

Typically, recruits approach the XP workstation and an operator selects the recruits name from a drop down list. The recruit then steps into the body scanner, and his measurements are taken. These measurements are converted into sizes and NSNs. A pick ticket of the sizes determined by the DigiSize software is produced. The recruit's data is then integrated with the ARN Control Panel data and an issue form is created. The recruit proceeds down the issue line with the pick ticket and is issued and fitted. During the final shakedown the recruit marks the issue form with oversight by MCRD-PI personnel. The scan forms are collected and scanned and the size data drives clothing issue, replenishment, and future tariffs
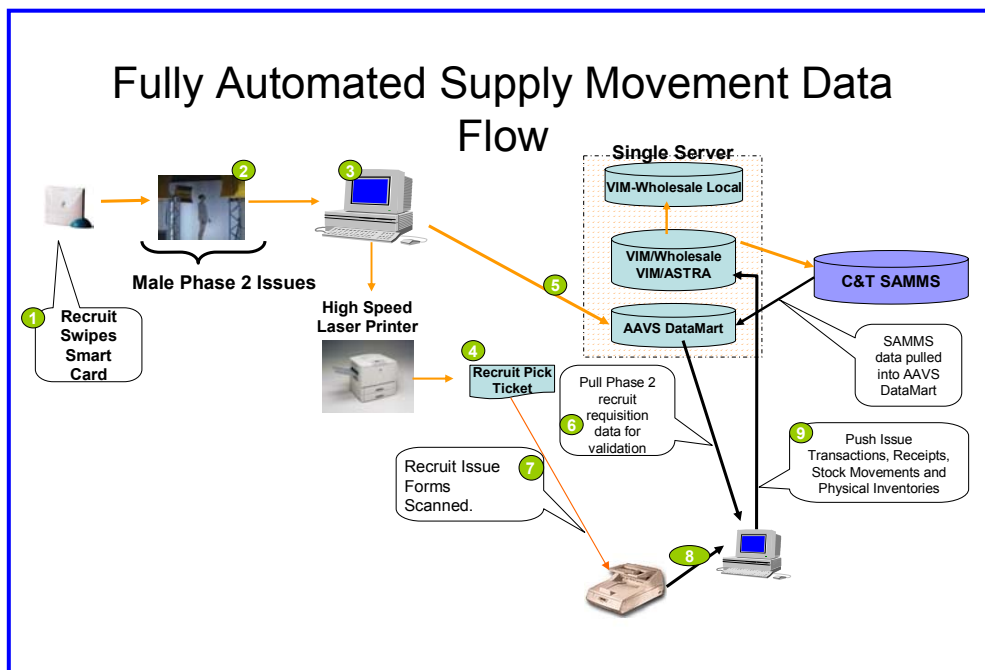
Figure 9 – Whole Body Scan & Generation of Size Data

6.2   Scope of the Task

The whole body scanning scope and implementation is shown in the table below. Recruits began the scanning process in July 2002. The purpose of these scans was twofold. First it allowed for the capture of measurements and the subsequent conversion to clothing sizes. This data then had to be captured and converted to stock numbers. Second it was an opportunity for the Phase II personnel to become accustomed to the scanning process and allow for the modification of the Phase II issue procedure to take advantage of the new scanning process.

The next step was to design an interface that would take the predicted Phase II sizes and populate a recruit specific issue form with the predicted sizes. Additionally, an interface

between the recruit's identification data from the ARN Control Panel needed to interface with the DigiSize (3D Body Scanner application) software. This was required in order to create a file with the recruit's sizes and identification data that would be imported back to the ARN Control Panel for production of the issue scan form.

Table 6 – Whole Body Scanning Scope and Implementation

Month/Year	Function
July 2002	First recruits scanned for data gathering purposes
September 2002	Programming of the NSN conversion program
November 2002	NSN Size Validation Routine
February 2003	Audit Reports (3D Body Scanner Accuracy Rate)
April 2003	Implemented a recruit smart card interface with DigiSize and a recruit master name selection interface
April 2003	Completed the interface programming between DigiSize software and the ARN Control Panel allowing for predicted sizes to populate the recruit specific Phase II issue forms.

6.3   Objectives of the 3D Body Scanner Integration

The objectives of the 3D Body Scanner Integration portion of this Short Term Project (STP) and project proposal leading to this FTR included:

- ➢   Using the 3D Whole Body Scanner to reduce the time and effort of manually measuring and fitting the male Phase II uniforms;

- ➢   Providing recruit specific issue forms with predicted sizing;

- ➢   Providing an audit mechanism to determine the accuracy rate of the 3D Body Scanner; and,

- ➢   Creating Phase II bar code issue forms.

Each of the above objectives was achieved with the possible exception of the reduction of time and effort for manually measuring and fitting of the male Phase II uniforms. This specific task is a significant research effort and has required major changes in processing of recruits and would require additional evaluation to accurately quantify the reduction in time and effort actually achieved. As a result of the 3D Body Scanner integration, the Phase II Male Uniform Issue processing effort involved has been realigned to new tasks and activities. Overall, previous operating procedures were evaluated and changed and staff trained as new systems and methods were introduced. Subsequently, results were evaluated and modifications made to

enhance results achieved. Following the completion of the project, support has continued to provide on-going improvements when possible through hardware and software enhancements and refinement of procedures used.

7.0   Program Integration Technical Approach

Several programs make-up the fully automated supply chain management solution, and though most of these programs were disparate at the onset of this project, all are tied together into a single solution. This has eliminated re-keying of data and the necessity of cumbersome nightly batch processes to update the MCRD-PI materials management system (VIM/WL).

The approach for this project is described in the following paragraphs (proposal section paragraph numbers are provided for reference to original project proposal if desired).

7.1 Initial Site Assessment and Report (Project Proposal Section 5.1)

  ➢ **Initial Site Visit and Information Gathering –** AdvanTech, Inc. performed a site visit and reviewed and confirmed the design concepts for this project. This assessment also included a feasibility study and cost assessment for completion and installation of the ARN network outside the MCRD-PI firewall.

  ➢ **HHT Site Evaluation by Symbol Representative –** A Symbol Technologies Inc. representative preformed a detailed site survey for hardware layout and connection requirements as well as provided a detailed price quote and delivery schedule.

  ➢ **Generate Implementation Report –** AdvanTech submitted an implementation report and schedule as part of the feasibility assessment.

7.2 Migrate QLM/Local to Internet Functionality (Project Proposal Section 5.2)

  ➢ **Design Internet Functionality -** AdvanTech used the QLM/Local system and functions as a guide for design of the Internet-based system.

  ➢ **Generate Specifications Document and Get User Approval –** AdvanTech used the QLM/Local specifications and received no additional requirements from users.

  ➢ **Program and Test Internet Functionality –** AdvanTech created the SQL database, ASP pages and on-line reports. The programs were then tested and debugged.

  ➢ **Generate User Documentation –** A users manual based on system functions and menu hierarchy was created with each incremental update of software.

➢ **Train Users –** AdvanTech provided training sessions in September 2002, November 2002, March 2003 and April 2003.

➢ **Transfer Data and Go-Live –** Once functions were operational, AdvanTech transferred the QLM/Local data to VIM/WL tables and MCRD-PI personnel started using VIM/WL.

➢ **Get User Acceptance –** Users are operating the system without assistance from AdvanTech and are satisfied with the performance.

7.3 Integrate Hand-held Terminal Functionality (Project Proposal Section 5.3)

➢ **Install and Test HHT Network Hardware –** AdvanTech coordinated with the Symbol Technologies representative for the RF hardware installation and cabling installation.

➢ **Integrate HHT Receiving –** AdvanTech implemented the HHT receiving module in March 2003 with training material and a user's manual

➢ **Implement Physical Inventory Control –** AdvanTech installed the HHT inventory program in December 2003. Training material and a users manual update were also developed.

➢ **Implement HHT Stock Movement –** AdvanTech installed the HHT stock movement program in April 2003 and user documentation was also created.

7.4 Scan Forms Interface with SmartCard Database (Project Proposal Section 5.4)

➢ **Extract Data from Legacy Recruit Data –** This task became obsolete after data extraction from the Smart Card was readily available.

➢ **Integrate Card Swipe for Night Room Issue –** The programs to read the Smart Card data and interface the data to the ARN Control Panel were completed in late August 2002.

➢ **Reformat Forms to Include Recruit Data -** Forms were modified to contain the Smart Card data in a bar-coded format.

➢ **Map Tables and Modify Conversion and Data Editing Programs –** As part of the conversion to the bar coded forms all data from the new forms was mapped to new forms tables. A conversion program was then developed to extract data from these new tables and create the issue transactions.

➢ **Implement CabinetNG –** CabinetNG and the interface were installed and users were trained on the use of the software.

➢ **Testing and Documentation –** The programs were thoroughly tested and user documentation was provided during training.

➢ **Operator Training –** AdvanTech personnel trained users during 4 different site visits.

7.5 3D Whole Body Scanner Integration Phase I (Project Proposal Section 5.5)

➢ **Design Concept/Operational Process Flow System Design –** This design was incorporated in the feasibility study.

➢ **Master Table Scan Data to NSN Repository –** AdvanTech working with Cyberware developed the Master Table Scan Data to NSN Repository.

➢ **Installation and Testing of the 3D Body Scanner –** Cyberware installed the hardware and software and performed calibration testing. The users were then trained on the operation of the scanner. AdvanTech provided MCRD-PI with a tool to evaluate the accuracy of size prediction of the scanning software. And AdvanTech and Cyberware worked together to create the recruit identification data interface from the ARN Control Panel to the scanning software.

➢ **Assessment and Validation –** Assessed the reliability and speed of using a digital modem v. a Satellite and assessed the feasibility of linking the 3D Body Scanner into the Electronic Order Form (EOF).

➢ **Develop and Submit 3D Body Scanner Integration Assessment Report –** AdvanTech provided this in the feasibility study.

7.6 Post Go-Live Support (Project Proposal Section 5.6)

➢ **Operator Training –** AdvanTech provided numerous training sessions to MCRD-PI.

➢ **Inventory Management –** AdvanTech personnel provided inventory management assistance with reorder parameters, inventory level management and physical inventory assistance.

> **ESOC Processing –** For a short period of time AdvanTech processed Emergency Supply Operations Center (ESOC) orders for the site as part of this project before transitioning ESOC processing to a maintenance function.

> **Implement Detailed Audit Reports –** Ensured that all designated MCRD-PI personnel were thoroughly trained on all aspects of the Audit Report functions.

> **Implement Recommended Stock Movement Report -** Ensured that all designated MCRD-PI personnel were thoroughly trained on all aspects of the Stock Movement Report.

> **Program Revisions / System Change Requests –** AdvanTech made revisions to code as software bugs or other requested enhancements were identified during testing. These were tracked and managed through a system used to record System Change Requests (SCRs), detail the changes suggested or requested, track approval or denial of requested change to programs, and other related information.

7.7 Project Management (Project Proposal Section 5.7)

> **Project Tracking –** AdvanTech tracked the weekly and daily status of milestones and deliverables.

> **Project Review and Follow-up –** AdvanTech utilized briefings and meetings to keep project personnel informed of project progress or problems.

> **Research Related Tasks –** AdvanTech researched the feasibility of using the Satellite system and determined that the best option was to use digital modem, or DSL where available. The linkage of the scan data to the Electronic Order Form was investigated and partially mapped but it was determined that additional programming effort would be required to link the data output from one system to the input of the EOF system.

7.8 Management Reporting (Project Proposal Section 5.8)

> **Management Reporting –** AdvanTech provided updates as directed.

> **Interim Progress Report –** AdvanTech provided monthly formal progress reports to project personnel

> **Contract Funds Status Report –** AdvanTech provided monthly formal funds status reporting to project personnel

- ➢ **Meetings and Meeting Preparation –** AdvanTech participated in several meetings regarding the status of this project.

- ➢ **Travel –** All training and onsite support was provided as necessary.

- ➢ **Final Technical Report –** The final technical report was completed and submitted.

8.0   Highlights of Implementation and Support

The overall concept, applications and integrated systems approach incorporating VIM/Wholesale Local, electronic forms management, use of hand-held terminal and the 3D Body Scanner has been well received at MCRD-PI. This section provides summary highlights of lessons learned and considerations for future research efforts.

Implementing the systems architecture and network setup was more involved than originally anticipated. Router setup was difficult and required several more days than allocated. Once these network bugs were resolved and the firewall and router were configured the remaining project was accomplished by incrementally installing applications.

The Cyberware application and scanner were installed in the summer of 2002, but they were not on the ARN network until November 2002, and they were not integrated into the fully automated solution until April 2003. The Control Panel and the Smart Card Reader were installed in September and October 2002. The RF applications were installed in March 2003, and QLM/Local was turned off and the site began using VIM Wholesale Local in April 2003.

At the conclusion of the project, MCRD-PI was interested in exploring other opportunities to use the 3D Body Scanner for female recruits and for recruits on a weight control program. These areas may be considered for future research as part of the Apparel Research Network and are discussed briefly under section 8.2 below.

8.1   Lessons Learned During Implementation

As with any new system, there were numerous difficulties and issues encountered that had to be resolved as efforts progressed. The following items highlight the key lessons learned:

8.1.1   Dependency on Site Personnel to Provide Network Support

Initially there was a problem connecting the main warehouse section with the ARN network. No Ethernet or fiber optic cable was available to connect these buildings back to an ARN switch or hub. Initial efforts to solicit support from the MCRD-PI Information Management department indicated that the site was willing to run fiber to connect these buildings.

After several months without a network connection to these buildings, AdvanTech, Inc. initiated an alternate means of tying these buildings into the ARN network. AdvanTech contracted to have a RF point-to-point solution between the warehouse areas and the main Clothing Branch building. This entailed adding an additional wireless access point in the main building with 1 antenna outside the building, which was then used to connect

the access points in the 2 warehouses across the street. 128-bit WEP encryption was implemented on all wireless points for complete security.

Future rollouts should incorporate a plan to bypass any requirements for support by the site's Information Management departments. Requirements for site network infrastructure should be coordinated with site personnel, but should be handled separately to ensure requirements are met accurately and efficiently.

8.1.2 Buy-In by Site Personnel Requires Local Champion(s)

There were MCRD-PI personnel championing this project. Both the responsible clothing officer and the non-commissioned officer provided the support and management direction of site personnel necessary to ensure new processes were utilized and all new applications and functions were used. This was especially true of the HHT receiving application and of the 3D Body Scanner.

8.1.3 Physical Inventory Processes

Formal inventories were conducted semi-annually prior to conversion to "wholesale local" operations. A representative from AdvanTech or DSCP should be on site for the first inventory with the new VIM/WL application and the new hand-held programs.

8.1.4 Location Systems

A critical success factor for the inventory control is a good location system that is outlined and loaded into the VIM/WL Supplemental Bin Locations module. If no location system is in place, support and guidance should be provided for the development of a system.

8.1.5 Body Scanner Usage

There was some initial anxiety from the fitters at MCRD-PI, but most, and eventually all recruits were scanned in the 3D Body Scanner. The speed of the body scanner processing is very important. If there is any wait time for the scanner operations, the issue procedure should be modified to measure for the headgear and footwear if possible.

8.2 Additional Areas for Future Research and Development

There were two areas encountered during the project support that should be considered for future research and development efforts. These included the development of software programs

and use of HHTs for stock movement and accuracy of the 3D Body Scanner size predictions. The following items highlight the issues related to these particular opportunities:

8.2.1 Stock Movement Program Using HHTs

This program objective was to develop and implement a stock movement process incorporating the use of Hand-Held Terminals to facilitate more accurate inventory records and stock picking activities. The results of the stock movement program developed required additional effort for the operator to enter both the location being decremented as well as the location being incremented. As a result, the program increased data entry requirements and did not really help track and prevent storage location problems. Accomplishing this objective would require significant enhancement to the software to provide automated support for stock movement functions including 1) order receipt/stock put-away processing; 2) maintaining stock location cubic storage capacity and current use; and 3) stock picking routines to track and capture all current active stock locations (and first-in/first-out movement of lots to ensure stock rotation).

8.2.2 3D Body Scanner Size Prediction Accuracy

Throughout the project, there were some concerns regarding the accuracy rate of the 3D Body Scanner. Examples previously noted included the accuracy rate for the prediction of the green sweater at below 20%, the green coat at less than 50%, and the long sleeve shirt at less than 70%. These percentages were well below the expected 85% rate found at MCRD-San Diego. In an effort to adjust for these lower percentages, the scan forms were designed to accommodate the predicted size plus 8 additional projected sizes, i.e., +/- four sizes to that predicted. The results achieved through this modification have enabled further refinement of the size predictions. Despite this change, there is some concern by the MCRD-PI fitters that the scanner is not as efficient as manually measuring each recruit. This refinement effort needs to continue in the future with careful research and modification of the size prediction tables used so that optimum results can be achieved through the use of this exciting and promising technology.

8.2.3 3D Body Scanner Use for Additional Issue Processing Support

MCRD-PI personnel expressed interest throughout the project in the possible expansion in the use of the 3D Body Scanner for issue processing for female recruits and for recruits on a weight control program. Program management may wish to consider these areas for future research as part of the Apparel Research Network activities depending on the costs and benefits of research and process improvement for these areas of support.

9.0   RESULTS ACHIEVED & METRICS

This section provides summary information on the results that were achieved at MCRD-PI. It is important to note that the support has not ended with the completion of this project and that refinements continue to be made to fine-tune operational support and efficiency of the supply chain activities.

9.1   Operational Objectives & Results

The expected benefits are: (1) more accurate inventory balances, (2) easier, faster and more accurate issue form completion, (3) achieve more accurate recruit identification data through the issue process, (4) faster, more efficient forms scanning process, (5) reduction in errors and edit checks during the scanning and data gathering process, and (6) development of the 3D Whole Body Scan technical report outlining the ROI of incorporating the use of 3D Whole Body Scan data into the Male 02 appointment issue form.

These changes and enhancements will further ensure that recruit issues are accurately recorded without adversely affecting MCRD-PI's performance standards during recruit issues. DSCP Item Managers will have better production requirement data, and wholesale-local inventory requirement predictions will be more accurate and support just-in-time inventory methodologies.

Inventory Discrepancy Rate with VIM/WL	Inventory Discrepancy Rate Before VIM/WL	OST with VIM/WL	OST Before VIM/WL
Approx 5%	Approx 10%	Approx 8 days	Approx 13 days

There were several objectives defined at the start of the project. The desired results from new systems or newly integrated systems included the following:

➢ **Asset Visibility –**
Both MCRD-PI and DSCP have a clear and near real-time picture of the stockage position at MCRD-PI.

➢ **Decreased Order Ship Time (OST) –**
Through the RF receiving module, receipts are closed much more quickly and the Inventory Too Low Adjustments have been decreased. This leads to higher inventory accuracy rates.

➢   **Improve Inventory Accuracies and Efficiencies –**
        MCRD-PI is certainly able to complete their wall-to-wall inventory very quickly.
        The new HHT inventory module means less duplication of effort and virtually no
        re-keying of data by a clerk after counts are completed. As for increased
        accuracy rates, the loss rate experienced using VIM/WL for the last MCRD-PI
        inventory was slightly less than 5%. Before these new integrated programs, the
        inventory loss rate was at 10%.

➢   **Improve Effectiveness of Phase II Male Issue Process –**
        The Phase II male issue process incorporates the use of the 3D Whole Body
        Scanner for nearly 100% of recruits. Although some procedures have changed in
        order to capture the sizes via the scanner, the actual data captured will be used to
        update sizing data tables in order to increase the accuracy rate of the scanner.

10.0 SUMMARY

There were several objectives associated with this project and ultimately to provide a more encompassing set of data that DSCP can use as a decision support tool or mechanism. Through VIM/WL, DSCP has information updated throughout the day that affects the expected zero balance report, the suggested order list and the overdue requisitions. Additionally DSCP is in a better position to monitor the daily activities that affect inventory balances by now monitoring the inventory adjustment report in VIM/WL. DSCP can now determine if there is a problem with inventory control before the semi-annual inventory.

10.1 MCRD-PI Objectives

This project has successfully met the stated objectives for improved systems for MCRD-PI users:

> ➢ The scan forms are much easier for recruits to use and MCRD-PI personnel to use. Scan forms process faster because the system is no longer interpreting the hand-written recruit social security number and platoon number data. This data is now provided in the form of a barcode that has a 100% readability rate within the software.

> ➢ The Smart Card reader application has provided an incredibly easy and very accurate mechanism to capture the recruits' identification data, and has provided a much more efficient mechanism to build the ARN Control Panel recruit master records.

> ➢ An excellent audit trail capability was built into the VIM/WL application. This module gives MCRD-PI personnel the ability to track the number of recruits scanned for a specific platoon and issue phase, and then determine the dollar value of the items issued, and determine if any scan forms or recruits' data was missing.

> ➢ An electronic filing/document management system was provided that automatically filed the recruit scan forms. This tool has been widely embraced in the Phase I issue area as a mechanism to ensure recruits are exchanging the items/sizes that they were initially issued.

> ➢ And lastly, not only was a study conducted on how to better improve the use of the 3D Whole Body Scanner, but these improvements were actually incorporated. Two different interfaces were provided to capture the recruit's identification data in the Phase II area. The Smart Card Reader is used to capture the platoon data for any recruit not previously assigned to the current platoon,

and an interface between the ARN Control Panel and the DigiSize software has provided the 3D Body Scanner operator with a very easy to use drop down list of recruit data to select prior to the recruit stepping into the scanner.

10.2   MCRD-PI Fully Automated Supply Management Data Flow

The following figure illustrates the data flow, as it exists now following the successful completion of this ARNII short-term project.
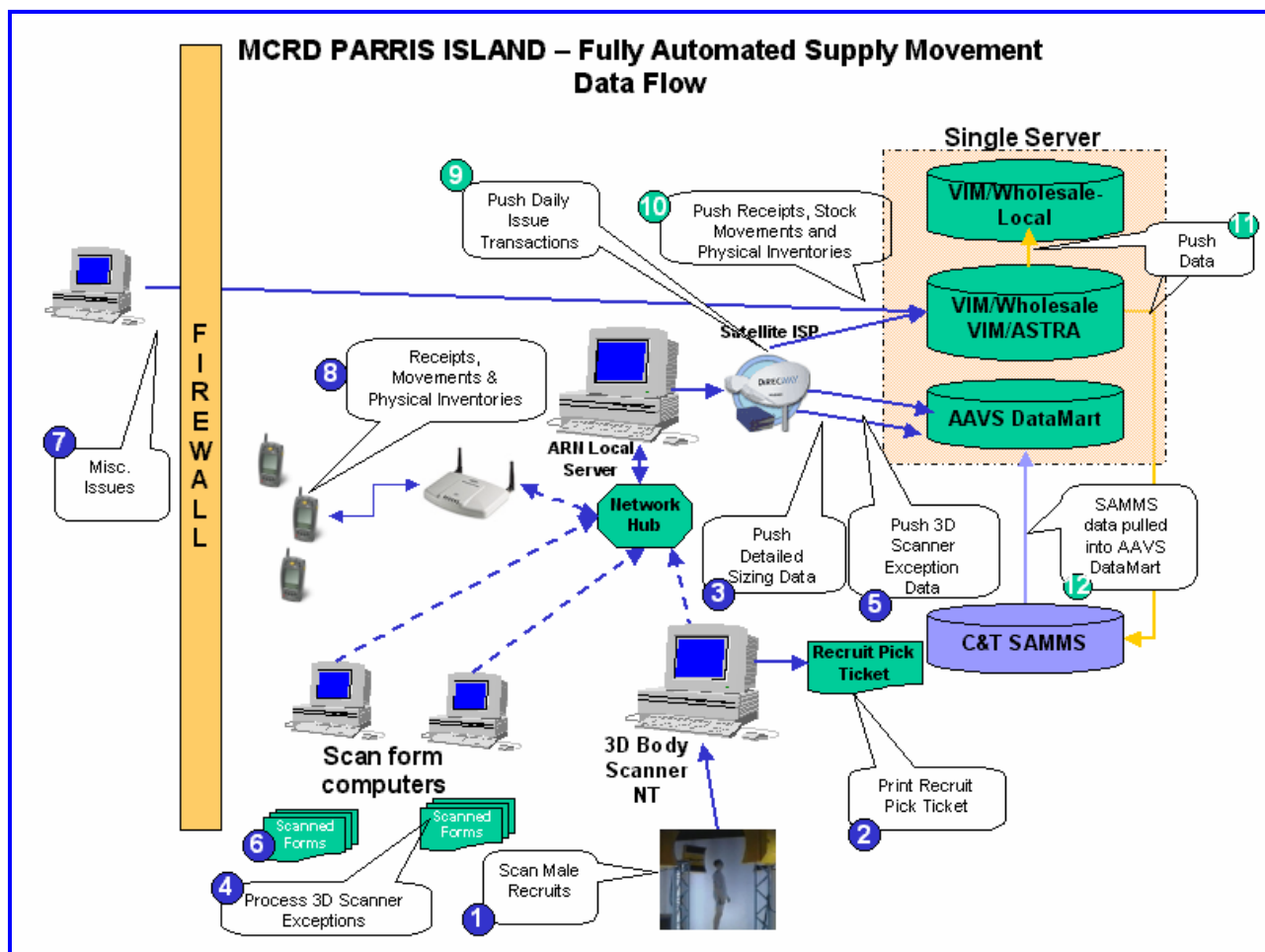
Figure 10 – MCRD-PI – Fully Automated Supply Movement Data Flow

APPENDICES

Appendix A – Definition of Terms & Acronyms

Appendix B – RF Survey

Appendix C – Project Personnel

Note: Additional references and ARN Supply Chain Management Technical Reports are available from the ARNII website at http://arn2.com/.

Appendix A – Definition of Terms & Acronyms

The following acronyms are used in this report and are provided to provide clarity of understanding for the reader.

♦ **ARN** – Apparel Research Network made up of selected industry and academic partners working together to develop innovative solutions for the Apparel industries support of military departments.

♦ **ASTRA** - ARN Supply-chain Transaction Repository Audit.

♦ **C&T** – Clothing and Textiles Division of the Defense Supply Center Philadelphia.

♦ **DOS** – Day Of Supply.

♦ **DSCP – Defense Supply Center Philadelphia -** DSCP controls the procurement and distribution of Medical, Subsistence (i.e., food), and Clothing and Textiles commodities to Defense Logistics Agency (DLA) depots and stock record accounts, worldwide.

♦ **ESOC – Emergency Supply Operations Center –** This refers to orders that are processed through the Emergency Supply Operations Center at DSCP. ESOC orders processed for different sites are now handled via contractor support as part of regular maintenance support for customers using the ARN VIM/Wholesale Local systems.

♦ **HHT –** Hand-Held Terminal

♦ **MCRD-PI** – Marine Corps Recruit Depot – Parris Island

♦ **MILSTRIP** – Military Standard Replenishment System

♦ **NSN** – National Stock Number

♦ **OL** – Operating Level

♦ **OST** – Order Ship Time

♦ **QDR** – Quality Deficiency Report. These are used to track items that are outside acceptable standards for issue to recruits. These reports provide

for communication with DSCP Item Managers regarding problems of quality that are encountered.

♦ **QLM** – Quality Logistics Management^{TM} – Material Management inventory system supporting acquisition, issues and distribution and predictive forecasting.

♦ **QLM/Local** – The QLM software implemented as a "wholesale local" inventory management system supporting acquisition, distribution and predictive forecasting at Ft. Leonard Wood as a prototype for future sites. The system provides a "local" capability to manage wholesale inventory assets located at the CIIP including receipt and inventory adjustment processing.

♦ **RIC** – Routing Identifier Code – Refers to a code used in SAMMS for identification of location where materials are to be shipped.

♦ **RTC** – Recruit Training Center (includes Army CIIPs) – These are the facilities operated by the different departments of the military where new recruits are inducted for basic training.

♦ **SAMMS** – Standard Accounting and Material Management System - This system is used by the Defense Logistics Agency, Defense Procurement Support Center.

♦ **System Change Requests (SCRs)** – SCRs refer to the process and procedures that are used to track requested revisions to systems software as enhancements are requested or operational "software bugs" are identified during testing or use in production. These are tracked and managed through a system used to record: System Change Request title/description; detail/describe changes requested; points-of-contact; authority for approval/denial of SCR; programming assignments; and tracking of disposition resulting (acceptance/rejection) of requested change(s) to program(s).

♦ **VB –** Visual Basic

♦ **VIM –** The Virtual Item Manager (VIM) system incorporates operational data extracted from the SAMMS Clothing & Textile (C&T) server as the basis for the operational and decision support capabilities provided in a single source of information for Item Managers at the retail (Recruit Training Centers) and wholesale (DSCP) level.

♦   **VIM/WL** – VIM Wholesale Local

Appendix B – RF Survey

Spectrum24 Site Survey Report
for
AdvanTech

Attention: Carol Fraser

Site Surveyed: Marine Corps Recruit Depot (MCRD)
                    Parris Island, SC

Survey Date: July 15, 2002

Date of Report: July 19, 2002 (Revised)

Survey Performed by: Wayne Brown

For more information, please contact:

> Account Manager: Wayne Brown
> Telephone: 804-527-2852
> Fax: 413-604-9586
> Email: brownent@attbi.com

Report Contents

1.   Radio Site Survey Overview

The radio site survey is a process by which test data is collected and used to determine hardware requirements needed to achieve **reliable RF propagation.** This enables use of the selected mobile devices in the areas required.

Data is collected by establishing two-way radio communications via a stationary and mobile unit at various points within a facility at **2.4 GHz,** utilizing the direct sequence method. Test units consisted of a Symbol Site-Survey utility with PC Card and a Spectrum24 Access Point with two external antennas.

Testing is performed with a free running program that constantly transmits, checks, and echoes data packets between the two units. Results are continuously displayed to provide instantaneous feedback. The mobile unit is moved throughout the area to be covered and results analyzed to determine the placement and quantity of equipment required to provide the required, reliable RF propagation zone. The focus is on acceptable packet receipt verses signal strength alone.

2.   Installation Considerations

2.1.   Network Considerations

Computer Pro's is not responsible for the integrity of the underlying network to which the Access Points will be attached, the impact of additional expansion, or increased stock levels.

2.2.   Electrical Installation Guidelines

Symbol equipment is designed to work on generally available AC. However, like all electronic equipment, its performance is subject to degradation due to some commonly inherent or random electrical problems or disturbances.

This report in no way implies or warrants that electrical problems will not present themselves at some future time.

Electrical installation alternatives are listed as **most** desirable to **least** desirable.

1. Isolated ground circuit with an on-line, uninterruptible power supply (UPS) which will also act as a filter and surge suppresser.
2. Isolated ground circuit with a surge suppresser.
3. Dedicated circuit with a UPS.
4. Dedicated circuit with a surge suppresser.
5. Non-dedicated circuit with a UPS.
6. Non-dedicated circuit with a surge suppresser.

Items 1 through 4 are recommended for a Network Controller Unit if present in your configuration. Deviation from one of these options can cause loss of data being transmitted.

Configurations 5 and 6 are not recommended. Due to the nature of a non-dedicated circuit, which has open receptacles, the load and type of use cannot be predicted at the time of installation. While the current draw of the Access Points is minimal, other devices on the circuit can affect them. If it is absolutely necessary to have a non-dedicated circuit, we recommend that the circuit **not** support:

- Any hard wired devices

- Any devices with components intended or known to produce heat e.g., space heaters, laser printers, heat guns, soldering irons, photocopiers.

- Any devices prone to causing sudden sharp surges in the power line or which contain medium or large motors, e.g., electric staplers, refrigerators, floor cleaning equipment, air conditioners, fans, drills.

- Any single device drawing more than 20% of the rated value of the circuit

- Any combination of devices drawing more than 60% of the rated value of the circuit

In all cases the power to the Access Points must be unswitched and available 24 hours per day. It is recommended that the power never be provided from an Energy Management System.

The input power requirements are:

2mb   FH Spectrum 24 Access Point: 115v ~0.4A or 230v ~0.2A

11mb DS Spectrum 24 Access Point: 115v ~1.0A or 230v ~0.5A.

2.3.   Other Environmental Considerations

Apart from building configuration, interior usage, and electrical considerations, there are other elements that might impact the performance of your system and that should be considered in your choice of equipment. These include:

- Ambient temperature ranges

- Dust, dirt, humidity, and weather elements

- Planned usage, e.g. light commercial vs. industrial

- Location susceptibility to lightning and/or power fluctuations

2.4.   General Recommendations
2.4.1.   Access Points

- A 110 VAC surge suppresser outlet is recommended for Access Point power. The minimum requirements are 24 hour and clean. (See Electrical Installation Guidelines).

- For maintenance purposes, all Access Points and shelves could be mounted no more than 10 feet above finished floors, unless the customer directs another height. If Access Points and shelves are mounted above 10 feet, it is necessary to bring down the Access Point for service. In this case, the customer must bring the Access Points down when service is necessary, or provide a lift to maintenance personnel.

2.4.2.   Feed Line/Data Cable

- Cabling should be run at ceiling level.

- Cabling should have a minimum three (3) foot clearance from existing AC power cables. **Do not install data cable runs in parallel within existing AC conduit.**

- Cable should conform to IEEE standards for the type of cabling specified.

- If an RF Control Unit or Gateway is to be used, allow an additional fifty feet (50) of cable for ease in any future relocation.

2.4.3.   Antennas

- Maximum clearance should be maintained around antennas. Minimum recommended clearance is three (3) feet.

2.4.4.   Special Notes

- To aid in locating the components of your Spectrum24 system once installed, keep a copy of this report in the computer room to be made available to any service technicians or electricians who may be doing work in your facility.

3.   Warranty of Coverage

The Computer Pro's Site Survey results reported herein are warranted by the Seller for one (1) year from Site Survey Report date to provide 100% RF coverage in areas designated by your representative and marked in Attachment C, Site Plan. This warranty applies if the equipment enumerated therein is installed, configured, and tested per this report, and there are no changes to the facility's structure, parameters within the building, or addition of RF device types other than those surveyed for use. Such changes may create the need for an additional survey of the site for an additional fee. This warranty applies only to coverage for those RF device types specified herein; these reflect the device types designated on the Buyer's Site Survey Request form. This warranty is limited to RF coverage and does not provide any explicit or implied guarantee relating to other Network Design parameters; such as, but not limited to: optimum network speed, data throughput, fault tolerance, redundancy, etc.

If any defect within this warranty appears and Buyer notifies Seller within the warranty period, Seller shall take necessary steps to resolve the issue within a reasonable time frame. These steps will include arranging for and performing a new survey of the site. Should this re-survey find coverage shortfalls in the equipment specified, Seller will provide a revised Site Survey report and provide any labor necessary to move existing, and/or install additional, equipment as specified in the revised report. Buyer is responsible for the purchase and provision of any additional equipment required. Should this re-survey find that the system was not installed in accordance with the specifications shown in this Site Survey report, Seller reserves the right to invoice the Buyer at current rates for the time spent in troubleshooting the installation plus expenses.

4.　Surveyor's Findings

The MCRD Depot Clothing will require 5 Access Points to provide 2mb, 5.5mb, and 11mb DS FH 2.4ghz RF coverage at 5 separate issuing buildings. Symbol Access Points, Model AP4131 will provide this service. 4 of these Access Points will be powered via DC power (supplied power-over-ethernet). The 4th will be direct AC powered. Equipment will be mounted, as noted in the "Equipment Placement Section" of this report, using a Symbol mounting bracket. All Access Points will have been up-revved to the latest firmware v3.5, segmented by DS channel, and optimized for Symbol mobile unit RF activity.

The network topology will be a flat network dedicated to the RF project and one specific application.

> Potential RF coverage areas include 100% of each building. However, the wireless QLM application only requires coverage in 75% of Building 6007, 100% of Building 694, 695, 50% of Building 927, and 25% of Phase 1 Issue Building. Additional Access Points may be placed as business processes and wireless applications dictate.

The survey was conducted based on the potential use of SPT1846, potential future use of other Symbol wireless hand-held terminals, or VoiP Wireless Phones over the same backbone.

During the RF testing, all clothing storage areas were at 60% stock levels. As a result, we required a higher level of RF data packet success for these storage areas in an attempt to quantitatively counter non-peak stockage levels. There is no guarantee that this methodology will provide acceptable levels of RF coverage during 100% stock levels.

5.　Radio Site Survey Results

The mobile coverage needed at this site can be achieved through installation of a Spectrum24 radio system with 6 Access Points. This system needs to be installed per the considerations above and the attachments below.

- Attachment A: Hardware Required

- Attachment B: Proposed 11mb RF Coverage

6.   Equipment Placement

Access Point (UAP) # 1 Bldg 6007

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Dry Wall*	Mounted To *Wall*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 1
Access Point# to HUB Body Scan	Cable Type: *10 Base T*	CAT5 Distance: 200'
Notes: Mount to the right of doorway in Phase II issue room, below electrical conduit. 1st Floor: provides RF coverage to 95% of 1st Floor. 85 % of this area is at 11mb throughput, 5% at 5.5mb, 5% at 2mb. No coverage in South lobby, elevators, mechanical electrical room. 2nd Floor: provides RF coverage to 100% of Administration area and South entry. The remaining areas were not surveyed.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Dry Wall*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *Wall*	Alignment *Inverse Mounted*
Ceiling Height 50 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 2 antennas mounted on both sides of the AP approx. 3' apart.		

Access Point (UAP) # 2   Bldg 695

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Wood*	Mounted To *Truss*	Grid Location **N/A**
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 6
Access Point# to HUB Office	Cable Type: *10 Base T*	Distance: 25'
Notes: Mount at top of exterior office wall on ceiling truss near external wall nearest bldg 694. Covers 100% of building interior at 11mb, exterior of building at 5.5mb up to the next building. Add 4-port Hub and patch cables to DSL modem and Office PC.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Wood*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *Truss*	Alignment *Inverse Mounted*
Ceiling Height 25 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 1 antenna mounted inside building on wood backing plate. 2nd antenna mounted outside building on treated backing plate		

Access Point (UAP) # 3   Bldg 694

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Steel*	Mounted To *I-Beam*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 6
Wireless AP to Bldg 695	Cable Type: *10 Base T*	Distance: N/A
Notes: Mount wood backing plate to support truss. Mount Access Point to front of plate to the right of main door. Covers 100% of building interior at 11mb, exterior of building at 5.5mb up to the next building.		

Antenna Mounting Information

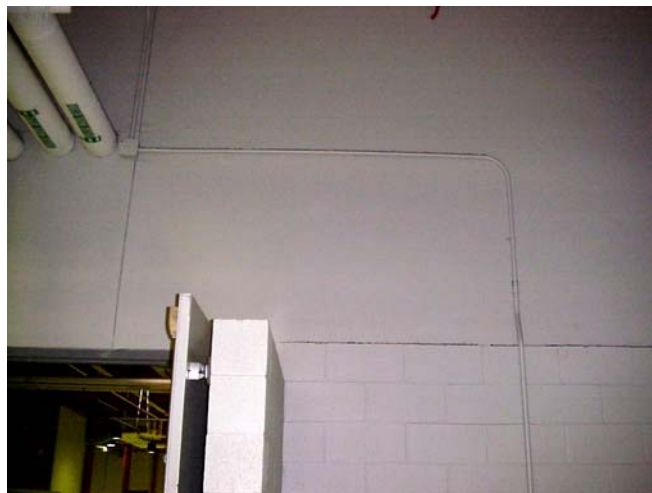|		
Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Steel*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *I-Beam*	Alignment *Inverse Mounted*
Ceiling Height 25 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 1 antenna mounted inside building on wood backing plate. 2nd antenna mounted outside building on treated backing plate.		

Access Point (UAP) # 4   Bldg 927

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 9 Ft
Material Type *Dry Wall*	Mounted To *Truss*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 11
Access Point# to Serial 56k Modem	Cable Type: *RS232 Straight*	Distance: 20'
Notes: External RS232 modem direct-connect to AP. Another modem will be needed in building 6007. QLM will need to monitor modem traffic. Building 6007 is 1-mile away, no line-of-sight. No LAN connection in building 927. Primary Location: Entering from Loading Dock, mount to the right, above Boards table, on ceiling. This is 40' away from 110v AC, 6' from RJ11 phone jack for modem. Secondary Location: Entering from Loading Dock, mount to the left, above 110v receptacle. This is 6' from 110v AC, 40' from RJ11 phone jack for modem. Covers 100% of Female clothing issue at 11mb. S4 offices were not surveyed.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Drop Ceiling*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 9 Ft	Mounted To *Ceiling Grid*	Alignment *Inverse Mounted*
Ceiling Height 9 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 2 antennas mounted on both sides of the AP as far apart as possible.		

Access Point (UAP) #5 Bldg Phase 1

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 15 Ft
Material Type *Steel*	Mounted To *Truss*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 11
Access Point# HUB	Cable Type: *CAT5*	Distance: Unknown
Notes: Added per Carol Fraser. Covers 100% of Male Phase 1 clothing issue at 11mb. The rest of the building was not surveyed.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Steel*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 15 Ft	Mounted To *Steel Girder*	Alignment *Inverse Mounted*
Ceiling Height 15 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 2 antennas mounted on both sides of the AP as far apart as possible.		

7.   Attachment A – Equipment and Materials Required

Supplied by Customer

Unshielded Twisted Pair Category 5

	Description	Part Number	Manufacturer	Qty
1.	Modular Cord or Patch Cable	*By customer*	*By customer*	*3*

10BaseT

	Description	Part Number	Manufacturer	Qty
1.	CAT5 Ethernet Cabling	*By customer*	*By customer*	*450'*
2.	RJ45 Connectors	*By customer*	*By customer*	*6*

Miscellaneous Materials (Nema Etc.)

	Description	Part Number	Manufacturer	Qty
1.	4 port Ethernet hub	*By customer*	*By customer*	*3*
2	External RS232 Modems	*By Customer*	*By customer*	*2*
3.	RS232 cabling (6')	*By customer*	*By customer*	*2*
4.	RJ11 phone cabling (10', 6')	*By customer*	*By customer*	*2*
5.	Treated Plywood (16"x 12") Bldg 694 For internal Access Point mounting	*By customer*	*By customer*	*1*
6.	Treated Plywood (4"x 15") Bldg 694-5 For external antenna mounting	*By customer*	*By customer*	*2*
7.	Plywood (24"x 15") Bldg 927 For internal Access Point and Modem	*By customer*	*By customer*	*2*
8.	Steel Girder mounting brackets	*By customer*	*By customer*	*2*

Purchase from Computer Pro's ,

Spectrum24™ Antennas

	Description	Qty
1.	Single High Performance Access Point Antenna (3dBi) with 4 foot Plenum cable connection, and mounting hardware	*10*

DC Power

	Description	Qty
1.	24V Power Supply for extended DC for one Access Point	*5*
2.	US Power Cord for UAP Power Supply	*5*
3.	BIAS-T power-over-ethernet	*5*

Spectrum24™ Universal Access Point

	Description	Qty
1.	Spectrum24 - 2.4 GHz, 100 mW, 11mb Ethernet Access Point, without PSU or Antenna.	*5*

Mounting Brackets

	Description	Qty
1.	Mounting Bracket plate	*5*
2.	Drop Ceiling Mounting Bracket plate clips	*2*

8.   Attachment B – Proposed 11mb RF Coverage

See 8 ½"x14" Color Drawings

Appendix C – Project Personnel

The following personnel were involved in various phases or tasks for this project. Each of these individuals played key roles and worked closely together in achieving the desired results from the new systems developed and implemented for MCRD-PI.

Marine Corps Recruit Depot – Parris Island Personnel

Individual	Position/Responsibility, Organization
Douglas D. DeLoach	NCOIC for Clothing Operations (MSgt), (Subsequent to retirement from duty assignment served as Subject Matter Expert to DLA/DSCP personnel and contractor)

Defense Logistics Agency & Defense Supply Center Philadelphia Personnel

Individual	Position/Responsibility, Organization
Sally DiDonato	Branch Manager, Clothing & Textiles, DSCP
Bernie Johns	Deputy Program Manager to ARN Program Manager
John McAndrews	Item Manager & Supervisor, DSCP
Kathleen Moore	Support Staff to ARN Program Manager
Michal Safar	Support Staff to ARN Program Manager
Julie Tsao	ARN Program Manager for DLA (Contracting Officer's Technical Representative)

Contractor (AdvanTech) Personnel

Individual	Position/Responsibility, Organization
Robert J. Padilla	Senior Trainer, Implementation Support
Robert E. Bona	Vice President, Operations
Carol E. Fraser	Director of Technical Services & Project Manager
Richard A. Perrin	President & Principal Investigator
Debra L. Wassel	Technical Support Specialist

APPAREL RESEARCH NETWORK (ARN) PROGRAM

Technology Assessment Report
Contract Number SP0103-02-D-0018 Delivery Order 004

Fully Integrated

Supply Chain Management

System - Phase II

Marine Corps Recruit Depot at Parris Island

Prepared for

Apparel Research Network (ARN) Program
Defense Logistics Agency
April 11, 2003

Table of Contents

Page

I. Executive Summary

The Apparel Research Network developed innovative technology solutions that subsequently improved recruit clothing supply chain management processes within DLA. Tremendous strides can still be accomplished through the integration of the somewhat disparate ARN systems. Marine Recruit Depot - Parris Island is the test site for the integration of these existing systems and the development of new solutions that will bring even greater efficiencies to the recruit clothing supply chain management process. The integration project consists of 3 phases (the first phase was accomplished in May 2002). The remaining phases tie all of the systems together and incorporate new applications and technology strategies.

Phase 2 consists of enhancing the use of the scan forms by improving the accuracy of the data collected and increasing the processing speed; enhancing the audit capability by incorporating smart card and bar-code technologies; validating the size selection accuracy of the 3d body scanner; automating the receiving, stock movement and physical inventory functions using radio frequency handheld data collection devices and bar code technology; converting the QLM/Local system currently residing at MCRD-PI to a fully functional, online real-time Internet Application; testing the use of satellite connectivity to the Internet to the ARN systems; and, outlining the development and implementation requirements for conducting Phase 3.

Phase 3 will consist of integrating the 3d body scanner into the supply chain by capturing and processing issue data, from the Male 02 Appointment issues, for inventory control and replenishment purposes.

The expected benefits are: (1) more accurate inventory balances, (2) easier and therefore faster issue form completion, (3) achieve more accurate recruit identification data through the issue process, (4) faster, more efficient form scanning process, (5) reduction in errors and edit checks during the scanning and data gathering process, and (6) development of the 3D Body Scan technical report outlining the ROI of incorporating the use of 3D Body Scan data into the Male 02 appointment issue form.

These changes and enhancements will further ensure that recruit issues are accurately recorded without adversely affecting MCRD-PI's performance standards during recruit issues. DSCP Item Managers will have better production requirement data, and wholesale-local inventory requirement predictions will be more accurate and support just-in-time inventory methodologies.

II. Introduction

This technology report will outline the system enhancements, necessary infrastructure requirements, overarching architecture and hardware requirements necessary for a fully automated supply chain management process at MCRD-PI.

First the current business practices and systems are examined and described. A complete description of each proposed technology modification/enhancement is then detailed. And finally, a revised timeline and accompanying cost changes are listed based on the technology modifications and enhancements.

III. Current Operations & Processing

Since the conversion of the MCRD-PI clothing inventory to DSCP-ownership in December 2001, most inventory management and replenishment actions have been under the control of ARN developed systems.

Issues to recruits, at all scheduled issue appointments, are recorded, processed, and reported on AutoData scan forms developed during Phase 1 of the Project. Supplemental issues, to include issues for profile changes to recruits, and issues to restock the Cash Sales Store are done using a MCRD-PI developed software routine called Clothing Miscellaneous Issue System (CMIS). Issues are manually entered into CMIS then merged with the scan form data prior to converting the issue data into j0A transactions, for transmittal to ASCOT/SAMMS.

Since conversion to Wholesale-Local inventory, replenishment actions are controlled by VIM. Inventory management personnel monitor inbound shipments on VIM and QLM/Local. After receipt and processing by the Warehouse Receiving Section, the receipt documents are forwarded to the Administrative Section and entered into the QLM/Local Receiving module

Under the previous legacy system, MCRD-PI tracked internal movements of stock from the Bulk Storage Warehouse to the individual issue points. The movement of stock out of bulk inventory was used as the trigger to initiate replenishment action, which could occur days and even months before the stock was issued. After conversion, the trigger was moved to the processing of the scan forms, which typically occurs within one working day after the issue is made.

Phase 1 Enhancement Opportunities

Three areas within the MCRD-PI ARN automation have been identified for phase 2 enhancements. These areas center on (1) scan forms, (2) receipt processing, and (3) data transmissions.

Scan Forms

Two specific issues should be addressed concerning the scan forms:

➢ Reproduction quality – MCRD-PI experienced a high scan failure rate due to poor reproduction of blank scan forms by the Base Reproduction Office. This problem was addressed and resolved by the Clothing Branch taking over forms production on internal laser printers or copy machines.

➢ Handwritten Alphanumeric Characters – The least desirable method of capturing data with scan form technology is the utilization of handwritten characters. Although the AutoData software has the ability to "learn" when scanning and reading handwritten characters, the myriad of writing styles from over 20,000 recruits per year negated this capability and remains the largest factor impeding the form scan process. This problem will be addressed and resolved during Phase 2 with the integration of the smart card and bar code technology onto the forms in lieu of handwritten characters. Scan forms, with bar coded Name, SSN, and Platoon Number, will be produced for each individual recruit at each issue process. The bar coded forms will be printed on laser printers.

Processing Receipts

Problems with processing must be addressed by DSCP.

➢ Lack of Bar Codes -- The DD Form 250, which is used as a shipping document by some suppliers, does not contain bar coded shipping information, such as document number. As a result, the data to record receipt of these shipments must be entered manually.

Physical Workflows

The following section provides recruit workflow diagrams for the MCRD-PI issue points. The Male and Female 01 Appointment Issue Point where recruits are issued uniform items on night of arrival at recruit training, the Male 02 Appointment Issue Point, to include the location of the 3d Body Scanner, and lastly, the Female 02 Appointment Issue Point.

Night Room

➢ 1. Recruit Smart Card data read upon entering Male and Female 01 Appointment Changing Area.

➢ 2. Recruits fall in on changing stations, receive briefing, and are sized by sight.

➢ 3. Recruits file into issue area, move down issue counter receiving uniform items.

➢ 4. Recruits return to Changing Area.

➢ 5. Recruits change into uniform, size exchange is done, and scan form filled out.

➢ 6. Scan forms produced while recruits are receiving issue.

Phase I : Recruit Flow and Floor Plan for Night Room Issue

Storage Area

Carousel Storage Racks

Issue Counter

Dressing Stations

Night Room Office

Not to scale

Dress Shoe Issue

Phase I : Recruit Flow and Floor Plan for TD-15/16 Issue

Storage Racks
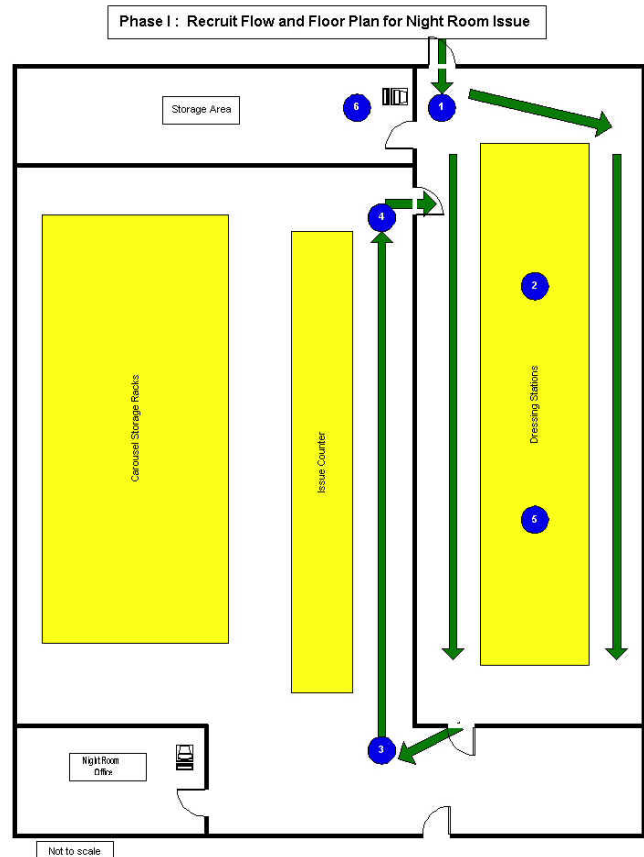
Not to scale
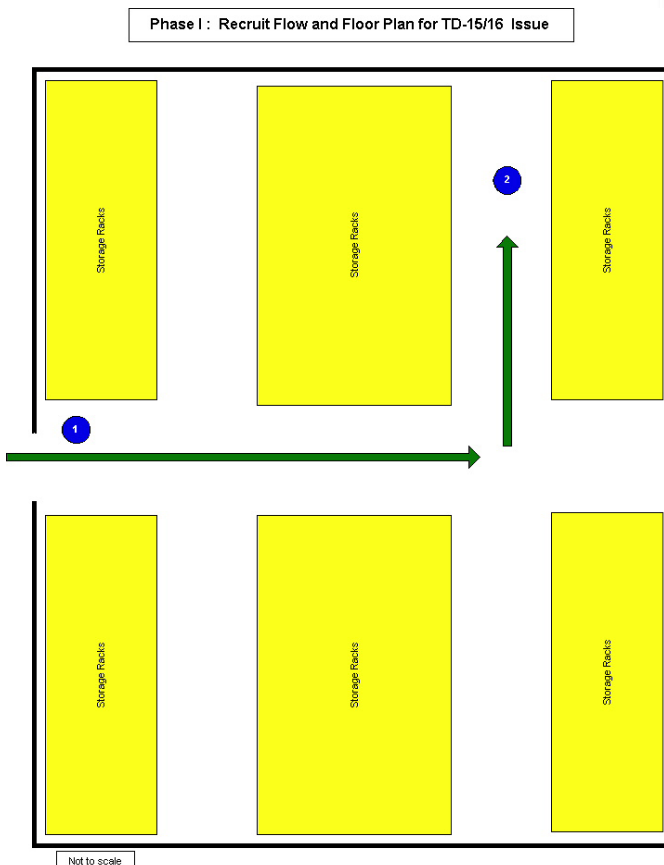
Currently, the male and female dress shoes are issued at the TD-15/16 Issue Point. The TD-15/16 Issue Point is situated in one of the bulk storage warehouses. Recruits are also issued the new Marine Corps-provided camouflage utility uniform.

1. Recruits (male and female) enter building and move to dress shoe issue location.
2. Dress shoes are fitted and issued. MCRD-PI is considering moving the male dress shoes to the Male 02 Appointment Issue Point. There is insufficient storage space to move the female dress shoes to the Female 02 Appointment Issue Point.

Male 02 Appointment

The 3d Body Scanner will be located in the rear area of building 6000. MCRD-PI plans to establish a queuing area to the right of the body scanner where they will conduct fitting for the covers (hats), prior to the recruits entering the body scanner area

The Male 02 Appointment Issue Point consists of a combination of gravity flow racks and issue counters. Recruits are guided through the various stations in this area to receive their dress uniform articles. The well-established pattern of recruit flow in this area will not change as the result of this project.

1. Recruits stage for scanning. MCRD-PI will use this queue time to fit covers and dress shoes.
2. Recruit inserts Smart Card into reader, personal information read from card. Recruit enters body scanner to be scanned
3. Body scanner pick ticket is produced and handed to recruit.
4. Recruit moves to issue area.
5. Recruit is issued uniform items based on pick ticket.
6. Recruit moves to dressing area and dons uniform.
7. Recruit moves to fitting and tailoring area.
8. Fitting is done. Size changes to Body Scanner predicted size are recorded on pick ticket.
9. Recruit move to Board Table to fill out bar-coded scan form and turns in pick ticket.
10. Recruit returns to dressing area. Process complete.

Phase I : Recruit Flow and Floor Plan Female Dress Uniform Issue

Fitting, Inspection & Tailoring Area

Not to scale

Shelving
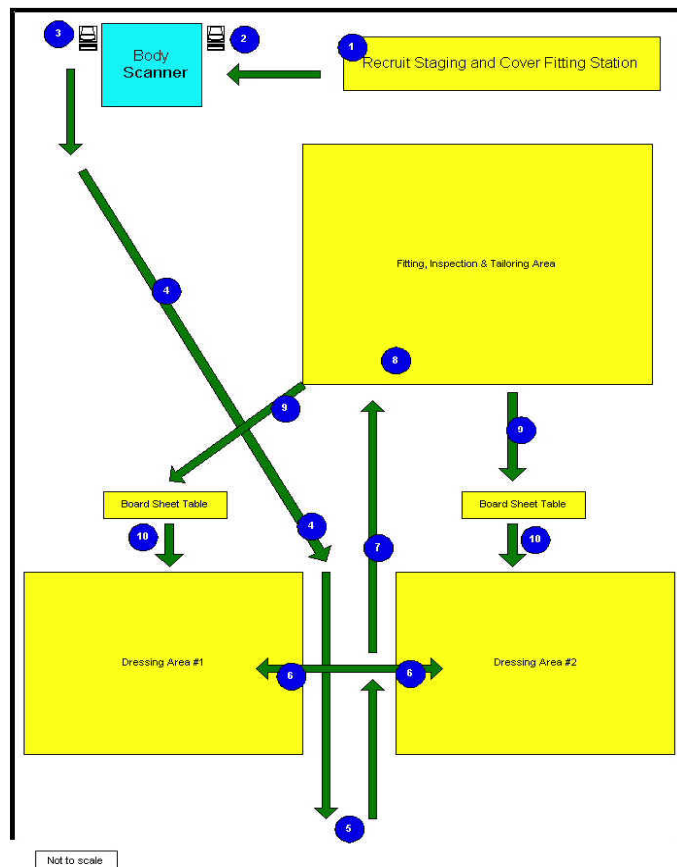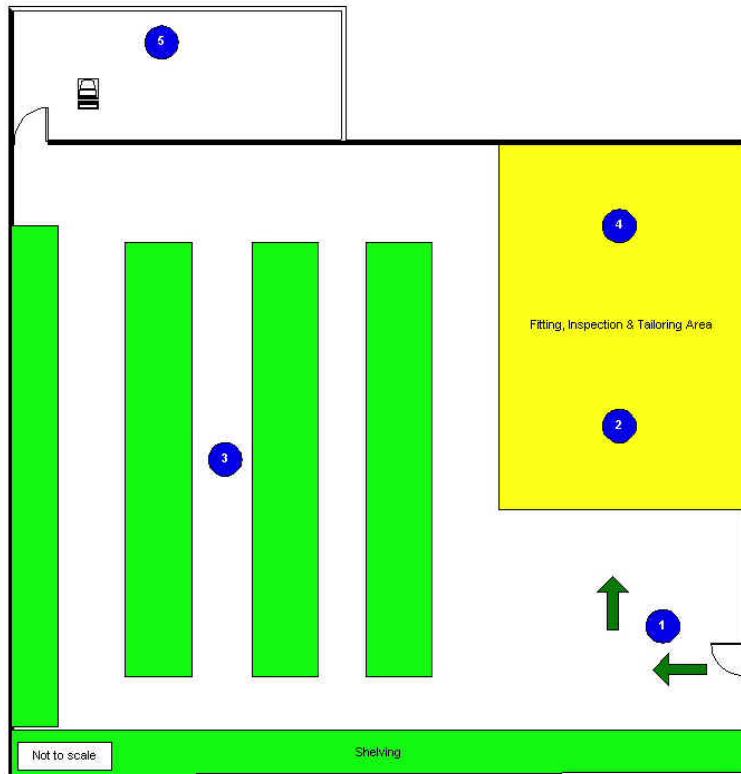
Female 02 Issue

1. Female recruits enter the issue point.
2. Female recruits assigned to station in changing area.
3. Issues are made by "try-on" method with assistance of clothing personnel. There in no set flow established.
4. Female recruits return to changing area for final fitting and tailoring. Scan forms are filled out at this time.
5. Scan forms are collected and turned-in to Clothing Admin office for processing.

IV. Overarching Architecture
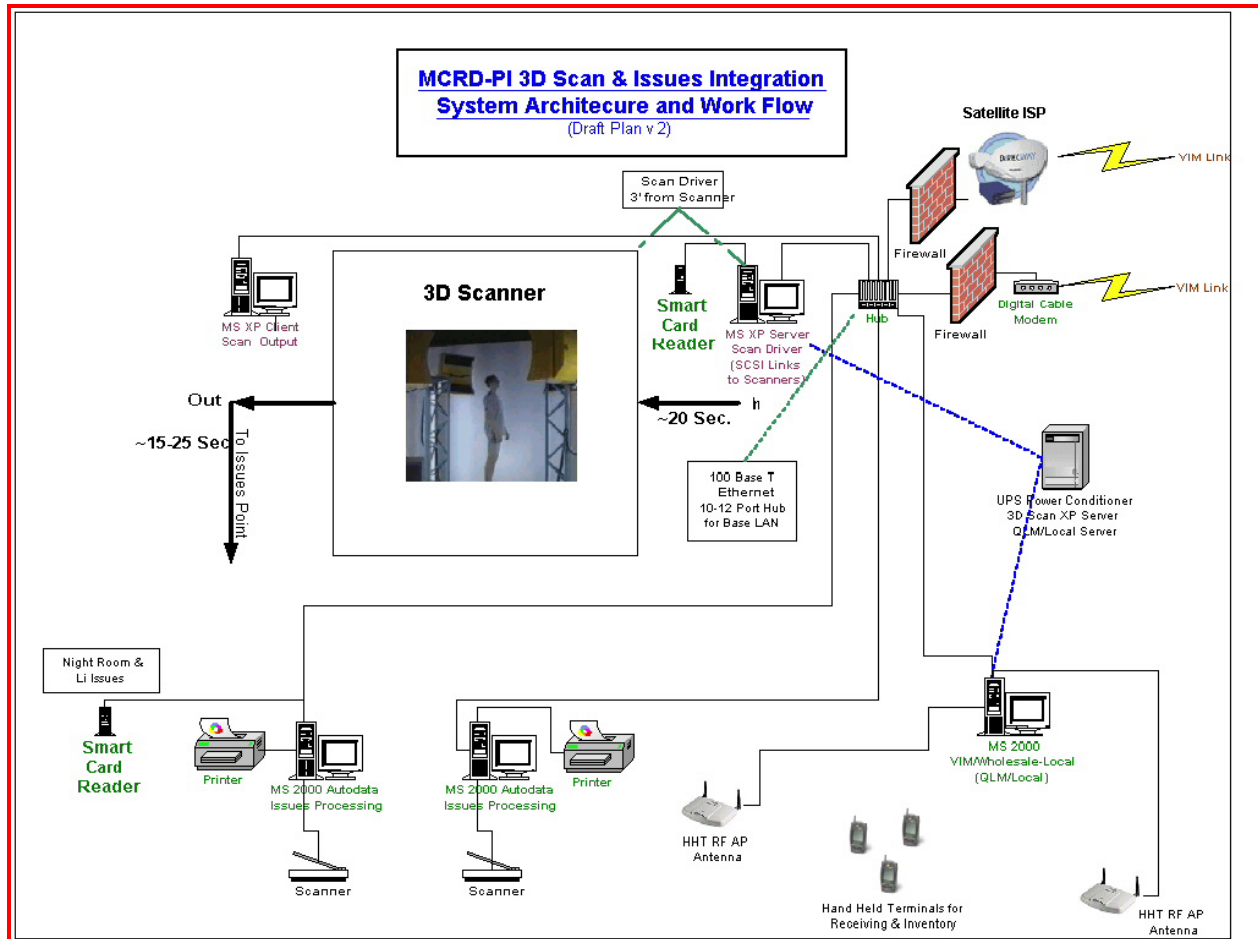
MCRD-PI 3D Scan & Issues Integration System Architecture and Work Flow
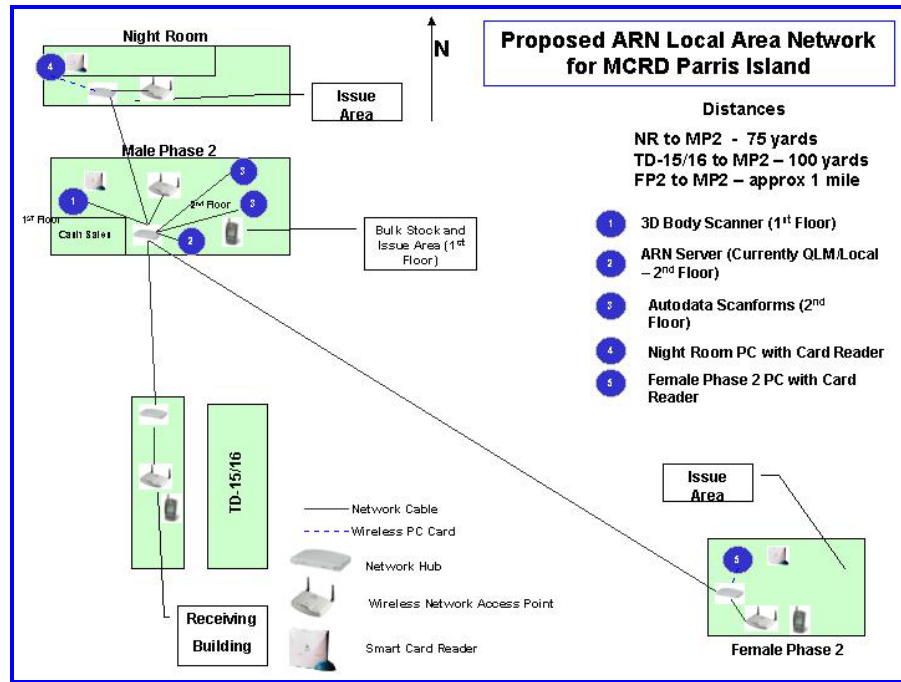
Proposed ARN Local Area Network for MCRD-PI

V. Smart Card Integration to AutoData Scan Forms

Overview

The AutoData Scan application is a tool that is used to capture detailed issue data for Defense Supply Center, Philadelphia. The AutoData Scan application is used to capture issues made to both male and female recruits at MCRD-PI. In order to accurately capture the issue data and subsequently decrement stockage levels, the AutoData Scan application has been programmed to track issues made to recruits by tracking the social security number, platoon number, stock number, quantity issued and date issued as an individual issue file. This data is then used to decrement each line item of supply issued to a particular recruit within a specific platoon on a specific day and thus provide an audit trail of transactions.

Business Requirement

The platoon number and social security number are pieces of data that are currently handwritten onto the Issue Scan form. Unfortunately the recruits' handwriting is at times

illegible which leads to misinterpretation of the data during the AutoData data processing. To preclude this problem from occurring an interface will be developed whereby the platoon number and social security number will be automatically populated onto the issue form from the recruits' identification card (smart card) or from the smart card database. This should improve the speed of Issue Scan form processing, improve the accuracy of data collection, and increase the accuracy of the data displayed in the Audit Report.

Implementation

A smart card reader will be installed at each issue point. The initial night room issue will create a Recruit Master record for each recruit smart card swiped through the reader. The record will contain the recruit's identification information (Last Name, First Name, SSN, Platoon Number, Active/Reserve status). Data from the Recruit Master database will be used to populate the Male and Female 01, Male and Female 02 Issue Scan forms. Current Issue Scan forms will be modified to accommodate the new barcode fields.

Phase I : Recruit Flow and Floor Plan for Night Room Issue
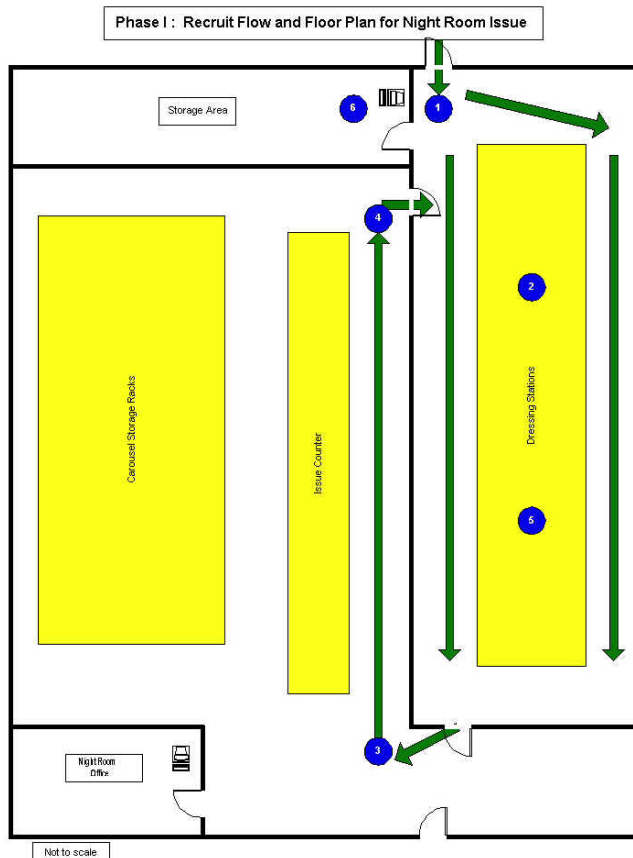
1. Recruit's smart card is scanned.
2. The Issue Scan form is printed while the recruits are receiving their issue.
3. Upon return from the issue area, the forms will be handed out and the recruits will be instructed on how to properly complete the remainder of the form.
4. After the forms are completed, Clothing personnel will collect the forms and hand over to the administrative office for processing.

(After the forms are produced, the recruit information will be stored in a separate data table to be used for all other bar-coded scan forms during Phase 2 of the project.)

Female 02 Appointment Issue Point. A workstation with card reader, connected to the ARN-LAN, will be installed at building 927.

Phase I : Recruit Flow and Floor Plan Female Dress Uniform Issue

Fitting, Inspection & Tailoring Area

Not to scale   Shelving
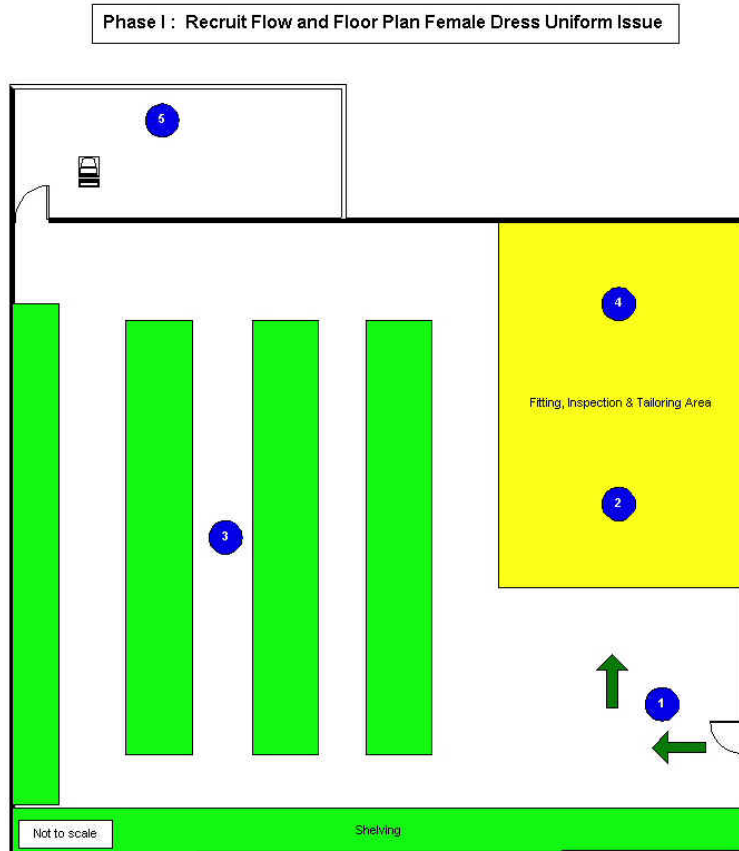
1. The bar-coded scan forms for this issue will be produced from the recruit data table developed from the Night Room smart card swipe.
2. The Issue Scan form is printed in the administrative office prior to the appointment.
3. The card reader at the issue point will be used in the event a recruit arrives and there is no scan form available.
4. When completed, the forms will be collected and turned in to the administrative office for processing.

Male 02 Appointment Issue Point.
During Phase 2 of the project, a workstation with card reader, connected to the ARN-LAN, will be installed at building 6000.

1. The Issue Scan forms for this issue will be produced from the recruit data table developed from the Night Room smart card swipe.
2. The Issue Scan form is printed in the administrative office prior to the appointment.
3. The card reader at the issue point will be used in the event a recruit arrives and there is no scan form available.
4. When completed, the forms will be collected and turned in to the administrative office for processing.
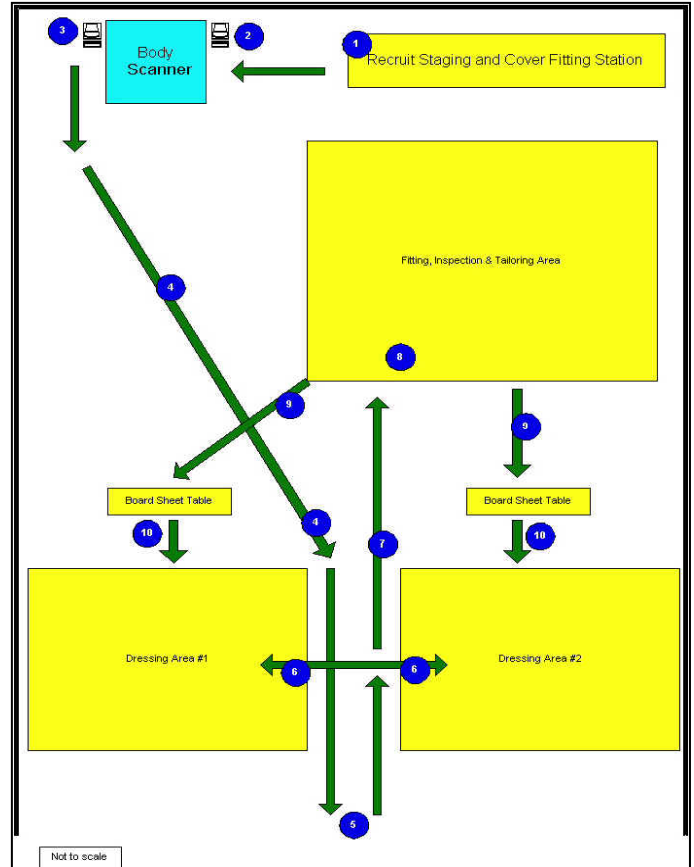
(Non-bar coded forms for each issue session will be maintained for instances where the smart card reader may not be available or operational.)

Security

#	Smart Card Issue	Smart Card Security Solution 1
1	Control of Sensitive SSN data	Only last 4 of SSN written to ARN Database

Risks

#	Smart Card Interface Risk	Mitigation	Probability
1	Problem of updating database from Bldg 927 and Bldg 6000 if RF	Consider modifying program to allow users to download recruit.db updates to a floppy and providing floppy disks to person responsible for maintaining the	High

#	Smart Card Interface Risk	Mitigation	Probability
	network connectivity delayed.	Recruit Master db.	

Application/Software Modifications

The AutoData Scan application has been changed from a Paradox database to an Access database. See Appendix A for a more detailed description.

Data Flow
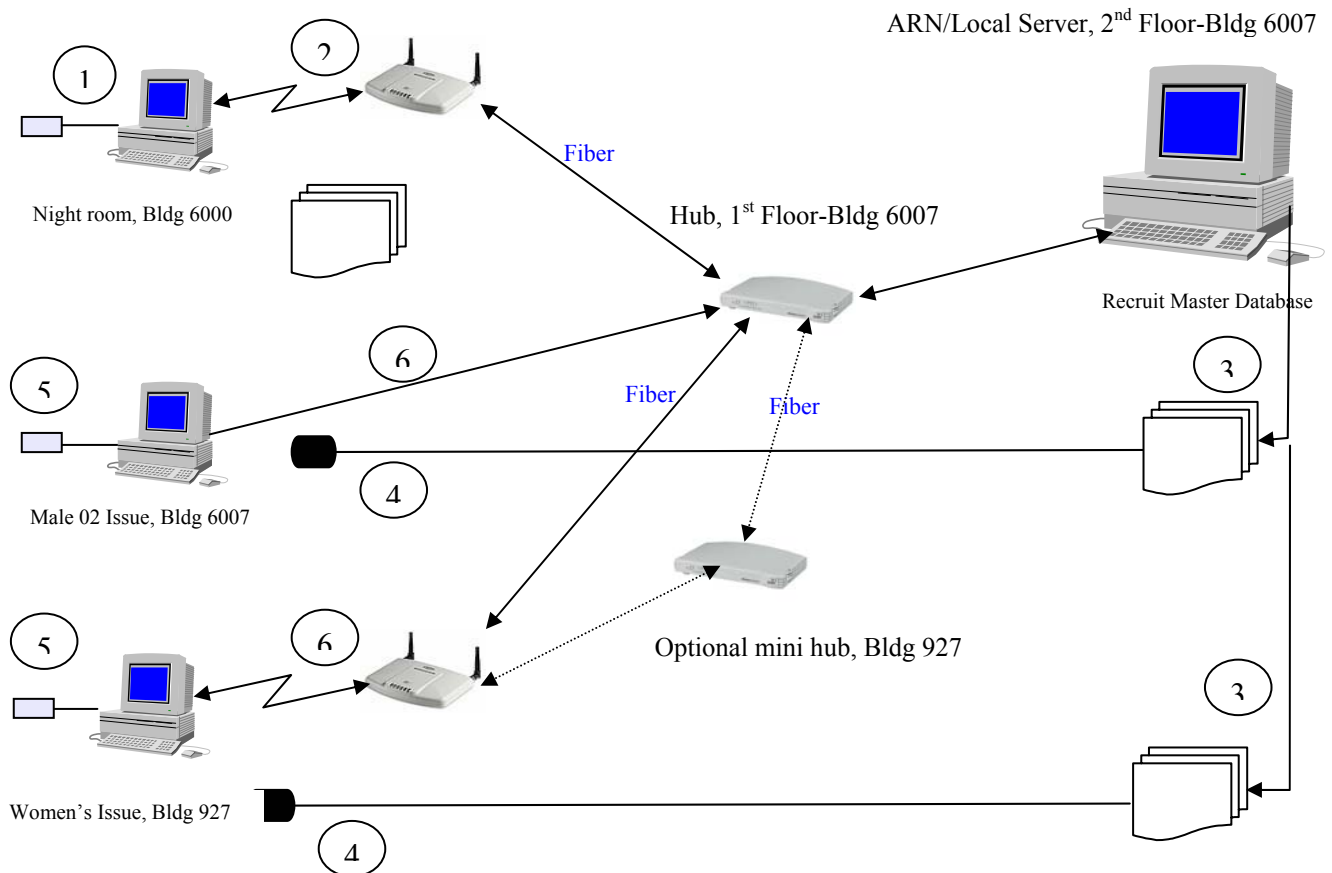
ARN/Local Server, 2nd Floor-Bldg 6007

Night room, Bldg 6000

Fiber

Hub, 1st Floor-Bldg 6007

Recruit Master Database

Male 02 Issue, Bldg 6007

Fiber   Fiber

Optional mini hub, Bldg 927

Women's Issue, Bldg 927

1. Read smart card and produce bar coded scan forms.
2. Recruit data file sent to ARN/LAN server and stored.
3. Recruit data used to create bar coded scan forms to specific platoons prior to a Male or Female 02 Appointment.
4. Pre-printed bar coded scan forms moved to Male or Female 02 Issue Point.
5. The card reader is used to create scan forms for recruits who have been transferred into the platoon since the roster was created at the 01 Appointment.
6. Updated recruit data is transmitted back to the server to update the recruit database.

Network Requirements

Operating System	Additional Hardware	Type of Connection
Windows 2000, Windows 95, Windows 98, NT4.0 Workstation	Hub, 2nd Floor connected to ARNLAN Hub, 1st Floor	Ethernet connection

Power Requirements

N/A

Hardware Description

Hardware	Specifications	Status
Workstation	- Pentium 600Mz 50 MB free hard disk space 128 MB RAM - True Color 16-bit or higher graphics resolution - Windows 95, 98, NT4.0 Workstation, Windows 2000, or Windows ME	MCRD-PI procuring new workstations, delivery date NLT 15Sep02 for M/F 01 Appointment; Female 02 Appointment, and Male 02 Appointment.
Server	- Pentium II or higher 1 MB free hard	Available and On-Hand
Printer	- HP 1200 or equivalent laser printer 600 dpi minimum	

Hardware	Specifications	Status
	• 15 ppm • 10 seconds first page capability	
Smart Card Reader		Available and On-Hand
Cable	Ethernet Cable to connect the 2nd Floor LAN to the ARN LAN; Fiber connects Female 02 Appointment workstation to ARN LAN; Fiber connects M/F 01 Appointment workstation to ARN LAN. Fiber connects bulk receiving NAP to ARN LAN.	

Installation Requirements

Installation will require five working days for installation, setup and testing, and two working days for training.

VI. Electronic Filing Management System

Overview

In order to provide an efficient manner in which to manage and retrieve (if necessary) the recruit issue forms, AdvanTech will incorporate a COTS document management product (CabinetNG). CabinetNG will electronically store the scanned image of each recruit's issue form. This will provide an easy and efficient method of searching for and retrieving any specific data needed for verification or correction. The data can then be easily archived or deleted as applicable.

Implementation

Five licensed copies of the COTS product will be used. These copies will be loaded to the two HP scanner PCs. Two copies will be loaded on PCs in building 6000, or on PCs in building 927 or on one PC in building 927 and building 6000. Site will have the ability to decide the best placement of these 2 copies of the software. The final copy will be loaded to the ARN LAN server.

An image of each form is captured automatically and filed to the CabinetNG server. Each user can then access the server files from their PC.
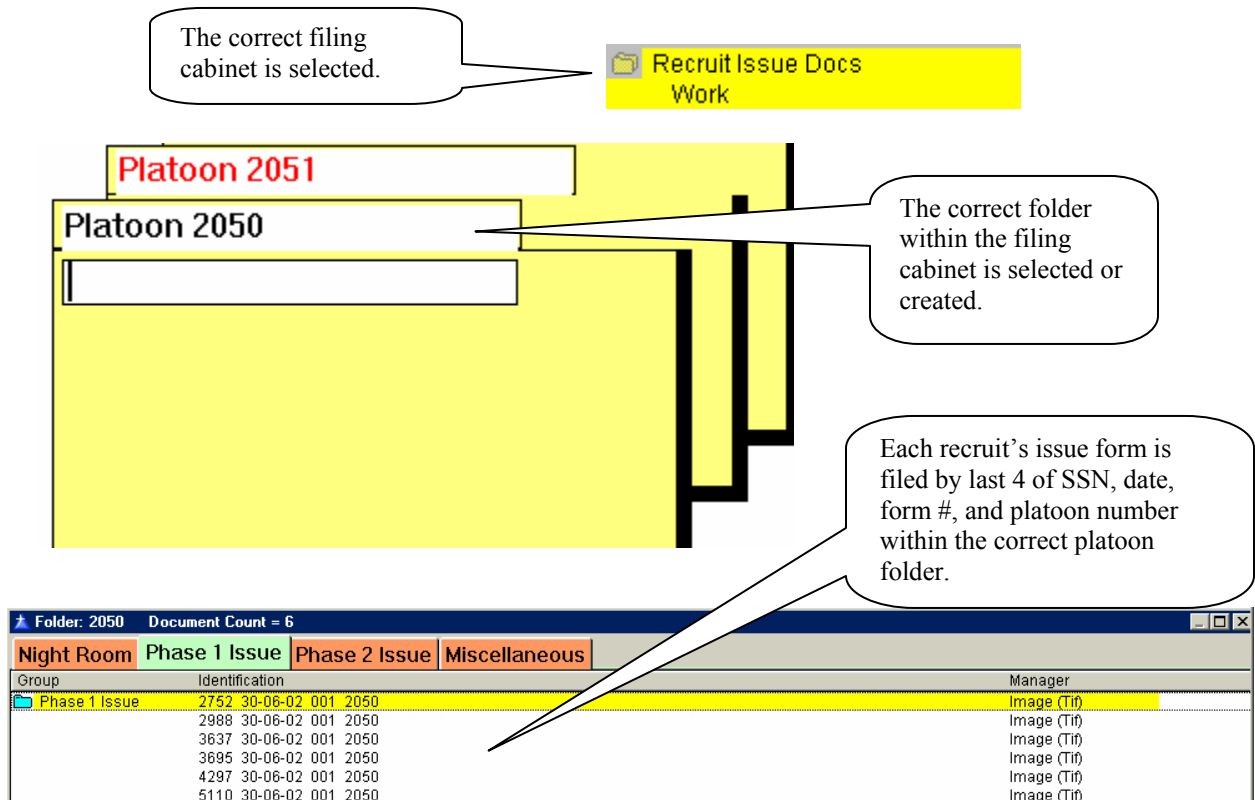
Security

#	CabinetNG Issue	CabinetNG Security Solution
1	Access to CabinetNG Cabinet	User login and password is unique to CabinetNG and must be established by the CabinetNG administrator. Only authorized persons will be given access to the Recruit Issues cabinet.
2	Access to Platoon Folders	Users that are granted access to the Recruit Issues cabinet will be given 1 of the following hierarchical privileges to all Platoon folders: View, Work, Create, Delete, Lock, Custodian (Establishes controls)
3	Access to Issue Form images with Recruit's Social Security Number	Users that are granted access to the Platoon folder will be given 1 of the following hierarchical

#	CabinetNG Issue	CabinetNG Security Solution
		privileges to all Recruit Issue Form image documents: None, View, Work, Create, Delete, Lock

Risks

#	CabinetNG Risk	Mitigation	Probability
1	Timeline slippage due to equipment purchase delays	No action by AdvanTech can control the purchase of the additional workstations	High
2	Timeline slippage for connection of buildings 927 or 6000.	No action by AdvanTech can control the cabling effort at PI.	High

Application/Software Modifications

Paradox Tables will be replaced with an Access database. See Appendix A, AutoData Scan Application Interface Requirements.

Hub, 1st Floor-
Bldg 6007

CabinetNG Clients

TBD

CabinetNG Server

Mini-hub, 2ⁿᵈ
Floor-Bldg 6007

HP Scanner PCs

ARN LAN Server
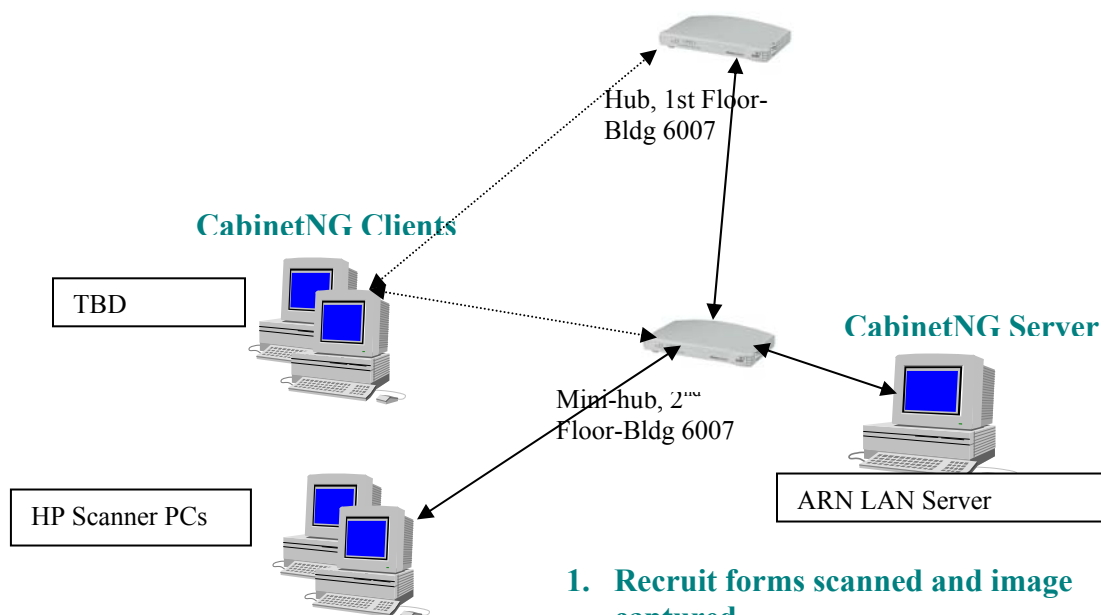
1. **Recruit forms scanned and image captured.**
2. **Image automatically filed on server.**
3. **Users access images.**

Data Flow

Network Requirements

Operating System	Additional Hardware	Type of Connection
Windows 2000, Windows 95, Windows 98, NT4.0 Workstation	Hub, 2nd Floor connected to ARN LAN Hub, 1st Floor	Ethernet connection inside building 6007. Fiber Optic connection from building 927 and 6000 to building 6007.

Hardware Description

Hardware	Specifications	Status
Workstation	• Pentium II or higher • 15 MB free hard disk space • 32 MB RAM • True Color 16-bit or higher graphics resolution • Windows 95, 98, NT4.0 Workstation, Windows 2000, or Windows ME	HP Scanner PCs meets this requirement.
Server	• Pentium II or higher • 1 MB free hard drive (For scanned images, more space is required. 20K documents requires 1 GB.)	Available and On-Hand
Scanner	Twain Compliant	Available and On-Hand
Cable	Ethernet Cross-Over Cable to connect the 2nd Floor LAN to the ARNLAN	New purchase

Power Requirements

N/A

Installation Requirements

One-half of one day for setup, two and one-half days of training.

VII. VIM/Wholesale Local, Web Based Materials Management System

Overview

Currently all 5 ARMY and 2 USMC Recruit Centers use a PC version of QLM/Local. These systems were developed to give the local users the ability to manually enter receipts and adjustments; perform physical inventories; incorporate issue transactions pulled down from the VIM/Wholesale ftp site and finally view their stock position at any time. These systems were linked to the AAVS DataMart and VIM/Wholesale via either a dial-up or ISDN Modem.

The purpose of developing an Internet Based system to replace the PC version is to provide the users with an on-line, real-time integrated application that would be able to show the users their current stock position almost immediately after the transactions (Receipts, Issues and Adjustments) are sent. The VIM/Wholesale Local reports would provide the Recruit Center Personnel as well as the DSCP item managers with an immediate picture of the current stock status.

The addition of the Due Member and Quality Deficiency Reporting (***QDR***) functions would complete the stock status information that is currently not being factored into the reorder requirements. The Due Member module would track by Social Security number the items owed or committed to each recruit. The "Qty Committed" would be factored into the computation of the Daily Suggested Order List." The QDR module would track and report the progress on all items that were need to be physically removed and or disposed from the Wholesale Local Sites. The quantity on hand would be reduced by the QDR quantity so replacement inventory could be ordered through the Daily Suggested Order List. The QDR record would be tracked and reported as an "OPEN QDR" until the inventory in question was returned or disposed.

Finally, implementing this Internet version would reduce the costs associated with maintaining each of the 7 PC based systems by replacing them with one set of programs that would have to be modified once instead of 7 times when releases are implemented.

Implementation

The implementation process would consist of the: initial development and testing phase; parallel testing and initial user training; data conversion from the current QLM/Local stand-alone system; and, follow-up user training and revisions.

Security

#	VIM/Wholesale Local Issue	Security Solution	Security Result
1	Data entry to VIM/Wholesale Local	User ID and Password control via VIM/Data Management	Only authorized users can access VIM for data updates.
2	VPN access	Controlled through Windows 2000 user security	Only authorized users can send data to VIM/Wholesale.
3	Management of the ARN Local Server network by site personnel may prove to be problematic with anticipated personnel turn over.	AdvanTech, Inc. will manage the ARN Local Server network for the site.	Continuity of contractor resources ensures no degradation in support, no additional site personnel training required.

Risks

#	VIM/Wholesale Local Risk	Mitigation	Probability
1	Speed and responsiveness of Internet connectivity on PCs behind the MCRD-PI firewall may hinder performance and user satisfaction	TBD	Low
2	VPN may not provide reliable connectivity to ARN Single Server	Revert back to ftp.	Medium

Application/Software Modifications

This is a new application that will include all functionality of the current QLM/Local stand-alone system plus the Due Member, QDR and data transmission routines required to provide an immediate updated picture on the VIM/Wholesale Internet screens.

Data Flow

The diagram detailed below shows the proposed dataflow. Steps 1 through 8 represent the collection of the issue, receipt and adjustment data. This data is staged on the Local ARN Network Server and then pushed to the VIM/Wholesale/ ASTRA databases on the ARN Single Server. Our approach will be to connect the ARN Local Network to the Single Server via the Virtual Private Network (VPN), which will eliminate the need for any type of batch ftp process.

Steps 9 through 12 represent the data flow from the ARN Local Server to the ARN Single Server and to and from C&T SAMMS. As the data arrives in the Single Server, the VIM/Wholesale Local database will be updated and the revised stock status will be reflected through the VIM/Wholesale Local Reports.
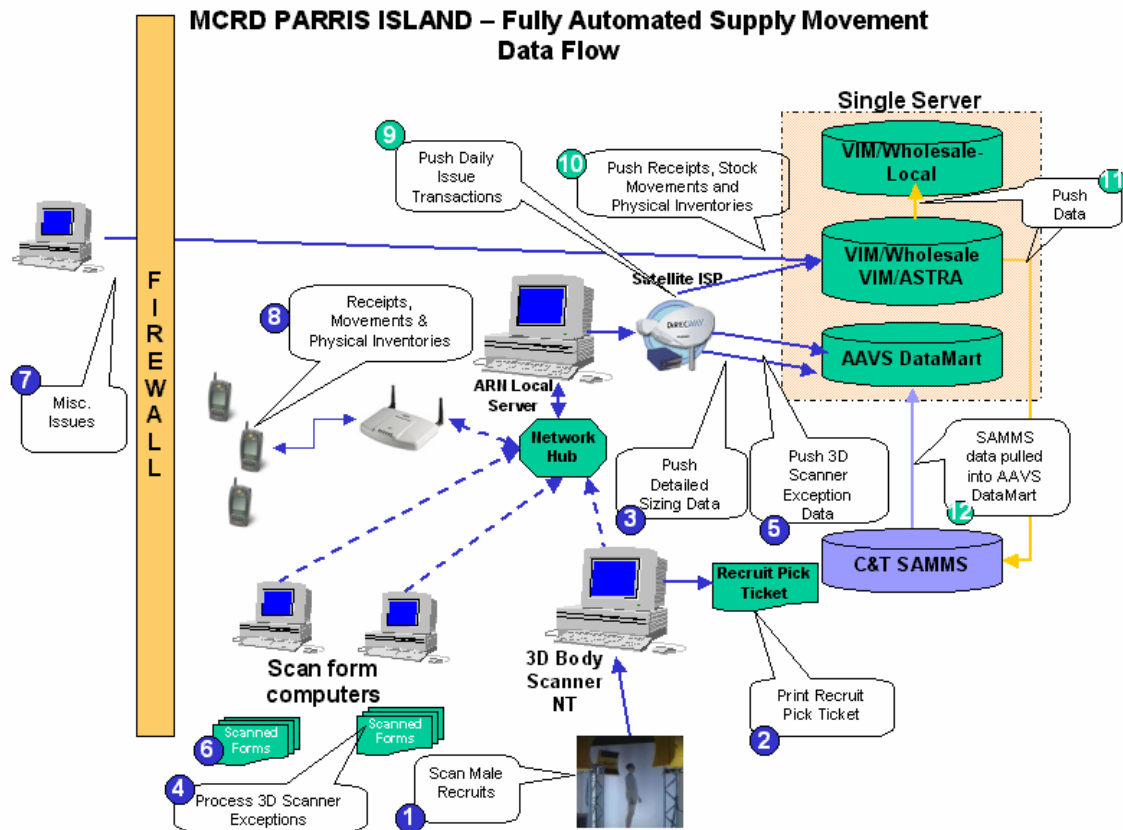
Network Requirements

It is our intent to connect the ARN Local Network to the ARN Single Server via the Virtual Private Network (VPN) that is now available as part of the Windows 2000 operating system. Ftp protocol and PC/Anywhere would be used as back-ups for the VPN.

Hardware Description

Hardware	Specifications	Status
Workstations	• No specific hardware requirements are mandated for VIM/Wholesale Local except the requirement for each Workstation to have access to the Internet.	All PCs in the clothing area meet the minimum necessary requirements.

Power Requirements

None.

Installation Requirements

The initial installation of the VIM/Wholesale Local functionality will be in parallel with the QLM/Local functions. Receipt data, adjustment data, physical inventory data and stock movement data will be processed in QLM/Local and simultaneously sent to VIM/Wholesale Local.

The MCRD-PI QLM/Local Stock Status will be compared each day with the VIM/Wholesale Local MCRD-PI Stock Status report until both Government personnel and AdvanTech personnel are confident that no transactions are dropped.

Conversion Plan

Each relevant function found in the QLM/Local application will be converted to an active server page (ASP) application. The major relevant functions and projected conversion dates are:

ASP development for current functionality by 02/28/03
        System programs redesign by 11/01/02
        Stockroom redesign by 11/1/02
        Inventory redesign by 11/30/02
        Physical Inventory redesign by 11/15/02

Purchasing 11/30/02
Receiving 11/30/02
Due Member 11/30/02
QDR 11/30/02
Reports 11/30/02

A thorough integration test will be conducted during December with documentation of system failures identified. Bug fixes will be made during December and January followed by testing. The proposed implementation date is March 3, 2003.

VIII. Radio Frequency Networking of Inventory Data

Overview

The current physical inventory process incorporates Novas handheld terminals. The manufacturer no longer supports these terminals and an alternative equipment solution is required.

ARN has settled on the Symbol Palm1846 handheld terminal with the Symbol Spectrum 24 Access Point for a Radio Frequency network configuration.

In order to comply with this configuration, the physical inventory programs should be converted to the new Symbol Palm 1846 handheld terminals. The RF receiving programs will be implemented at Parris Island. And the stock movement program, which tracks the movement of an item of supply from location A to location B, will be developed and implemented. All of this data will be transferred via the RF network.

Implementation

Network hardware setup will begin after cabling of Bldg 6000, Bldg 694, Bldg 695, and Bldg 927 to Bldg 6007. A Symbol representative will install the NAPs and additional hardware based on the implementation described in the Site Survey Report for MCRD-Parris Island found in Appendix B.

Training on the maintenance and use of the handheld terminals and the network access point will be conducted after implementation and after all handheld terminal applications have been completed. Training will consist of: (1) a general overview of the equipment, (2) how to use a Palm HHT, (3) how to process receipts, stock movements, and physical inventories using the Palm HHT, (4) how to load software updates to the handheld, and (5) how to troubleshoot the Network Access Point.

Security

#	RF Issue	RF Security Solution	RF Security Result
1	RF Network Access Point	The Network Access Point will be restricted to the static handheld and PCMCIA card MAC addresses. This is known as MAC Address Filtering and is used by the NYSE and AMEX to secure their networks.	No rogue handheld or wireless device can transmit data over the Network Access Point.
2	Windows 2000, Login	Network login will be granted by user id, password and authorized device/computer name.	No authorized user can use an unauthorized device to access the network.
3	Windows 2000, Time of Day Access	Network access will be limited by user and time	Prevents users from accessing the network during non-duty hours.
4	Palm 1846 HHT	A user id and password will be required in order to turn on the HHT.	Prevents an unauthorized user from using an authorized device to access the network.
5	Palm and PCMCIA Data Encryption/Decryption	Intent is to implement the AES standard pending adjustment in timeline and dollars.	Prevents user login, password and application data from being intercepted and deciphered.
6	Tables with SSN and User Ids and Passwords	Tables containing either SSN or userid and password are locked with an additional password.	Prevents unauthorized access to sensitive database tables.
7	QLM Updates	Palm programs to update inventory data require a QLM login and password.	Prevents non-QLM users from modifying QLM data.

Risks

#	RF Risk	Mitigation	Probability
1	Timeline slippage due to	Develop non RF	High

#	RF Risk	Mitigation	Probability
	network security certification process DITSCAP	process to capture and transmit updates to the Recruit Database	
2	Recruit database updates if NAP goes down or PCMCIA card communication problems occur.	HHTs can transmit from any NAP and docking station. Recruit Database will update and print based on the immediate scan. Any RF network problem will be resolved before the Recruit Master is needed again for the second issue.	Medium
3	Timeline slippage for RF application completion due to additional Parris Island requirement.	Rewrite of the functional and technical specifications in order to address the changes requested by PI. (PI does not want a stock movement program that forces entries at each issue location. They would like to be able to designate what types of stock movements and which locations will use the stock movement program.)	High
4	Timeline slippage for complete RF solution waiting for PI to complete cabling requirements for Bldg 6000, 694, 695, and 927.	No action by AdvanTech can control the cabling effort at PI.	High

Application/Software Modifications

The major changes to the current MCRD-PI handheld application are: (1) the incorporation of RF technology, (2) a change in the hardware platform and subsequent change to the current physical inventory programs, (3) addition of a stock movement application, (4) addition of the receiving application, and (5) addition of a thumb pad interface. See Appendix C for the functional requirements.

Data Flow

Receipt data, stock movement data and physical inventory data are transmitted from the handheld to the ARN/Local server (2nd Floor-Bldg 6007). See diagram below.

1. Clothing, 1st Floor-Bldg 6007

2. Night room, Bldg 6000

Hub, 1st Floor-Bldg 6007

ARN/Local Server, 2nd Floor-Bldg 6007

3. Main Receiving, Bldg 695

Optional mini hub, Bldg 927

4. Women's Issue, Bldg 927
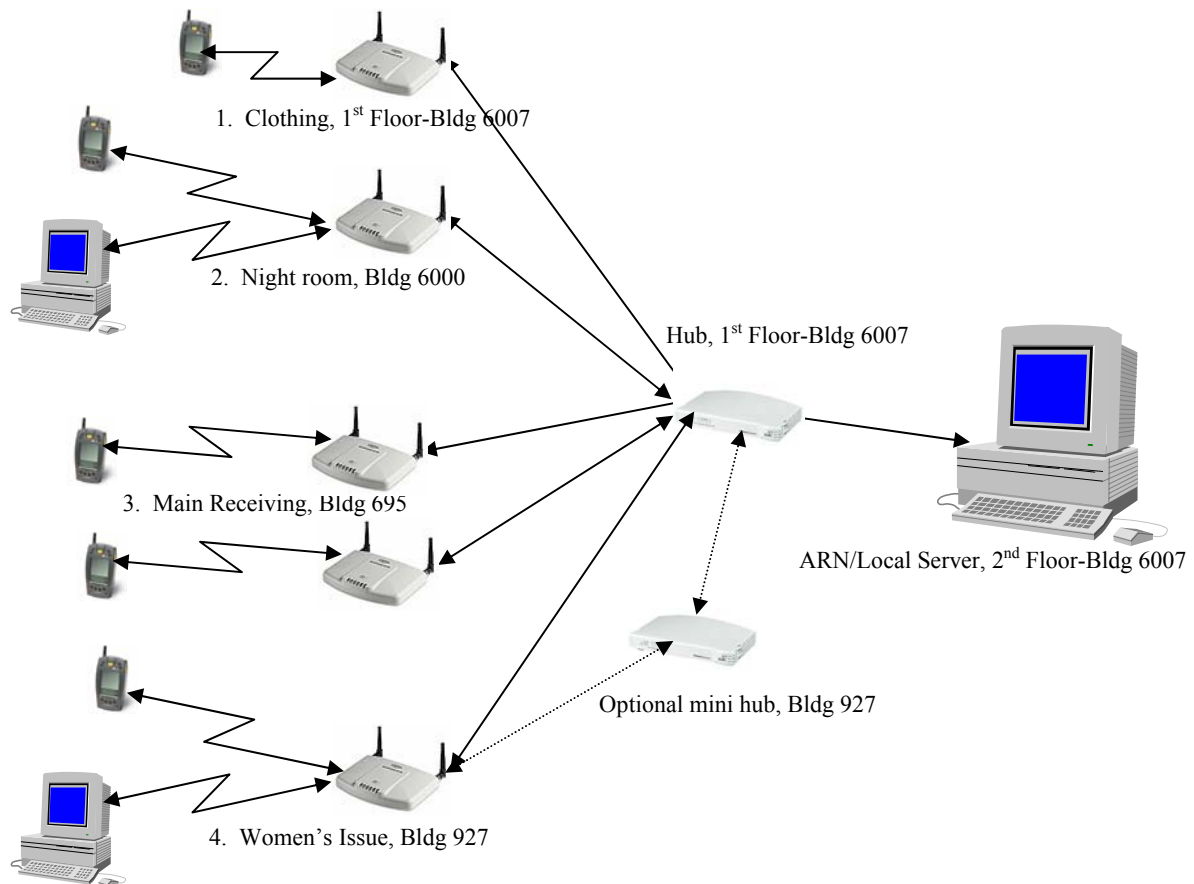
Network Requirements

Item	Description
RF Network	Symbol 11MB Spectrum 24 Network Access Points Connect NAP via fiber optic to hub in bldg 6007

Item	Description
	Connect ARN/Local Server to hub
Internal Network Linkages	Use 100 Base T Ethernet hubs and routers
Driver Software Support	Microsoft Windows 95/98, Windows NT 4.0, Windows 2000, Windows ME; NDIS 4 and 5
Access Protocol	CSMA/CA
Roaming	Virtually Instantaneous

Hardware Description

Hardware Description	Model	Feature
Handheld Terminal	Symbol 1846	1 dimensional scanning, uses Symbol Spectrum24 Radio to perform 11 Mb local area wireless communications;
	Symbol 1846	Memory Configuration – 4 Mb ROM & 8 Mb RAM
Network Access Point	Symbol 4121	11 Mbps direct sequence (DS) high data rate transmission
	Symbol 4121	IEEE 802.11b compliant; Wi-Fi certified
	Symbol 4121	High-Speed Roaming
	Symbol 4121	Automatic Data Rate of 111, 5.5, 2 and 1 Mbps
	Symbol 4121	Multi-mode security: WEP 40 and 128 bit encryption; Symbol's Kerberos V5 based mobile security; or combination
	Symbol 4121	Kerberos V5 Open Security Standard based on the Network Authentication Protocol developed by MIT
	Symbol 4121	Point-to-Point Wireless Bridging

Hardware Description	Model	Feature
	Symbol 4121	Automatic Transmit Power Control
	Symbol 4121	Mobile IP
	Symbol 4121	Event logging, data packet tracing, SNMP alarm generation, operating statistics, protocol and bandwidth filters for optimal network management
	Symbol 4121	Output range up to 450 meters outdoors and 90 meters indoors
	Symbol 4121	Support for up to 127 clients per access point
Radio	Symbol Spectrum 24	Frequency 2.4 GHz
	Symbol Spectrum 24	Data Rate: 11 Mpbs per channel maximum
	Symbol Spectrum 24	Maximum Output Power: 100 mW worldwide
	Symbol Spectrum 24	Power Management: Continuous Aware Mode and Power Saving Polling Mode
	Symbol Spectrum 24	Range: 450 meters outdoors and up to 90 meters indoors
	Symbol Spectrum 24	TX Max Radiated EIRP: FCC regulations part 15.247
	Symbol Spectrum 24	Modulation: Direct Sequence Spread Spectrum (DSSS) with BPSK (1 Mbps), QPSK (2 Mbps), and CCK (5.5 and 11 Mbps)
	Symbol Spectrum 24	TX Out-of-Band Emissions: FCC regulations part 15.247, 15.205, 15.209

Hardware Description	Model	Feature
	Symbol Spectrum 24	Operating Temperature: -4 to 158° F
	Symbol Spectrum 24	Client Support: Up to 127 clients
PCI Card	LA 41X3 PCI Adapter	11 Mbps direct sequence high data rate transmission
	LA 41X3 PCI Adapter	IEEE 802.11b compliant
	LA 41X3 PCI Adapter	Automatic data rate and channel selection of 1, 2, 5.5 and 11 Mbps
	LA 41X3 PCI Adapter	Very low power consumption
	LA 41X3 PCI Adapter	Fast software upgrade via FLASH memory
	LA 41X3 PCI Adapter	Supports all popular network operating systems
	LA 41X3 PCI Adapter	Semi-slot form factor: 6 in.L x 4 in.W x 0.5 in. H/16.2 cm L x 10.2 cm W x 1.3 cm H
	LA 41X3 PCI Adapter	Dual connectors for external antenna
	LA 41X3 PCI Adapter	Commitment to open standards at every hardware and software interface including IEEE 802.11b, HTML user interface, NIC utilities
	LA 41X3 PCI Adapter	Wired Equivalent Privacy (WEP) encryption and decryption
	LA 41X3 PCI Adapter	Wi-Fi™ certified

NAP Power Requirements

	Recommendation / Requirement	Rating
1.	Isolated ground circuit with an on-line, uninterruptible power supply (UPS) also acting as a filter and surge suppresser.	Most Desirable

	Recommendation / Requirement	Rating
2.	Isolated ground circuit with a surge suppresser.	2nd Most Desirable
3	Dedicated circuit with a UPS.	3rd Most Desirable
4	Dedicated circuit with a surge suppresser.	3rd Least Desirable
5	Non-dedicated circuit with a UPS.	2nd Least Desirable
6	Non-dedicated circuit with a surge suppresser.	Least Desirable

Option 1 is the recommended solution. See Appendix B for complete power requirements.

Installation Requirements

See Appendix B for complete specifications and implementation requirements.

IX. 3D Body Scanner

Overview

A 3d Body scanner has been in use at MCRD-SD since 1998 and has proven to have accuracy rates significant enough to eliminate the manual measuring and fitting process. At MCRD-PI the 3D body scanner will be used to predict sizing of selected male dress uniform items. The body scanner was installed on the ground floor of Building 6007, the main Clothing building, where the Male 02 Appointment is conducted and became operational during the last week of July 2002.

AdvanTech will work with other ARN team members to develop the constructs of the Master Table Scan Data to NSN Repository. This table will be maintained on the AAVS DataMart with batch updates to the local environment on a scheduled basis.

Installation and testing of the body scanner will include compiling the sizing data from 3D scanner and providing MCRD-PI a tool to evaluate and analyze the sizing accuracy linked to the Social Security Number level. This includes any program modifications to the DigiSize software to manually enter and store each recruit's Social Security Number instead of the Call Number.

An assessment and validation period will determine and test specific communication linkages, including DSL and Digital Satellite between Scanner, ARN systems and the MCRD-PI ARN/LAN network. Also included in this assessment will be reviewing the

feasibility of linking the 3D Body Scanning data to the Electric Order Form (EOF) for all
Special Measurement requirements.
Business Requirement

The 3D Body Scanner is used to reduce the amount of time and effort spent manually
measuring and fitting recruit uniform items. As an adjunct to automating the measuring
and fitting of recruit uniforms, a method to automate the creation of bar coded scan forms
based on sizing predicted by the 3d Body Scanner will bring efficiencies to the issuing
process.   And lastly, To automate the issue reporting requirement and utilize that
information to generate appropriate replenishment actions.

Implementation

Phase 1 – Install 3D Scanner and interface data from Smart Card
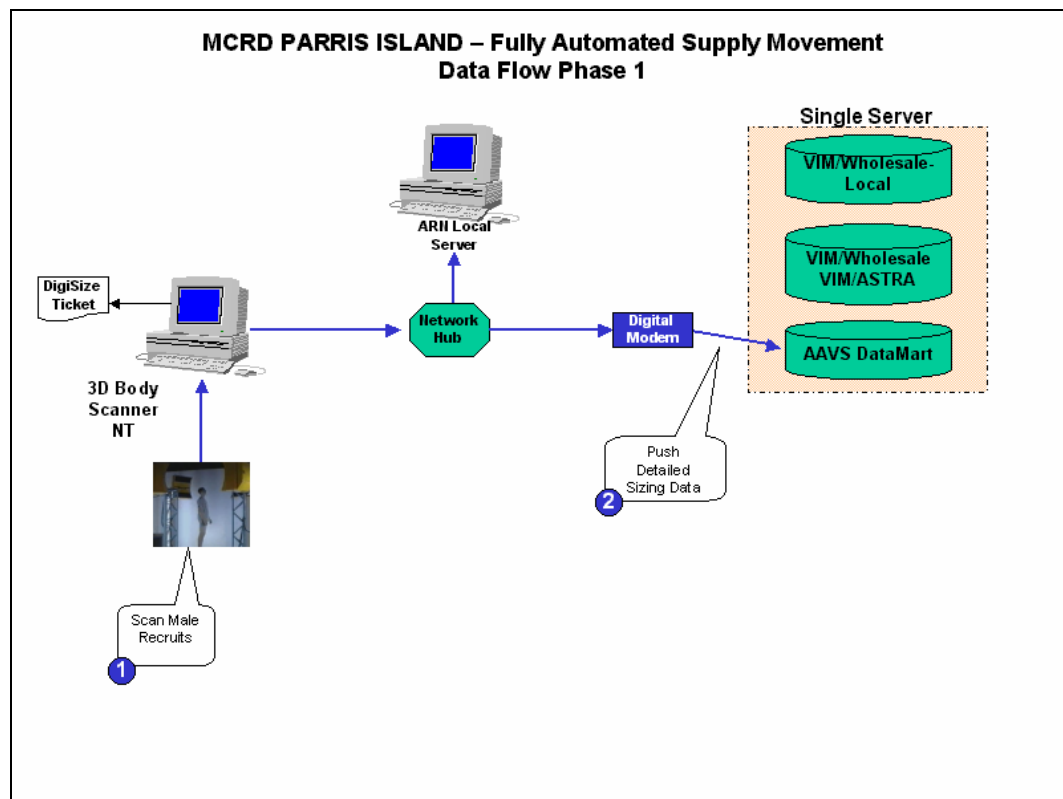
Cyberware will ship, install, calibrate, and conduct user training prior to 31 July 2002.
Cyberware will modify the software to accept manual entry, or entry by Smart Card
reader, of recruit social security numbers into each scan record. The scanner will be

installed in the ground floor of Building 6007, the main Clothing building. The scanning of male recruits commenced at the Male 02 Appointment Male on 31 July 2002.

Cyberware will modify their software to allow the entry of recruit SSN, via manual input or smart card reader, as identified versus the platoon roll call number used at MCRD-SD. This will be precursor of using the smart card data to produce a bar coded scan form that incorporates sizing from the body scanner.

AdvanTech and PDIT will coordinate the process of collecting the data from the 3D body scanner, pulling the data into the AAVS DataMart on the ARN Single Server and then translating the scanner data into individual NSNs for the following PGCs:

PGC	PCG Description	Standard Issue
01683	Coat, all-weather, man's	1
01876	Shirt, man's poly/wl l/s	3
01887	Shirt, man's khaki short sleeve	3
01893	Sweater, man's, pullover, olive green	1
02043	Trousers, men's, p/w, gab, green	2
02044	Trousers, men's, p/w, gab, blue	1
02049	Coat, man's poly/wl gab green	1

MCRD-PI will redesign the recruit flow through the Male 02 Appointment in order to optimize the process flow in conjunction with the 3D Body Scanner.

```
            Cyberware
            DigiSize

Monday, 12 August, 2002, 11:58:06
DBN:  684

Last 4:  4161
Laundry #:  32
Platoon:  2077


SWEATER, MAN'S        34

SHIRT, MAN'S          15 1/2 / 36

TROUSERS, MAN'S       32 long

COAT, MAN'S           40 Regular

COAT, ALL-WEATHER     40 Regular

CAP, GARRISON         7 5/8

FRAME, SERVICE CAP    7 5/8
```

Phase 2 – Data validation processes and Satellite Communication Tests
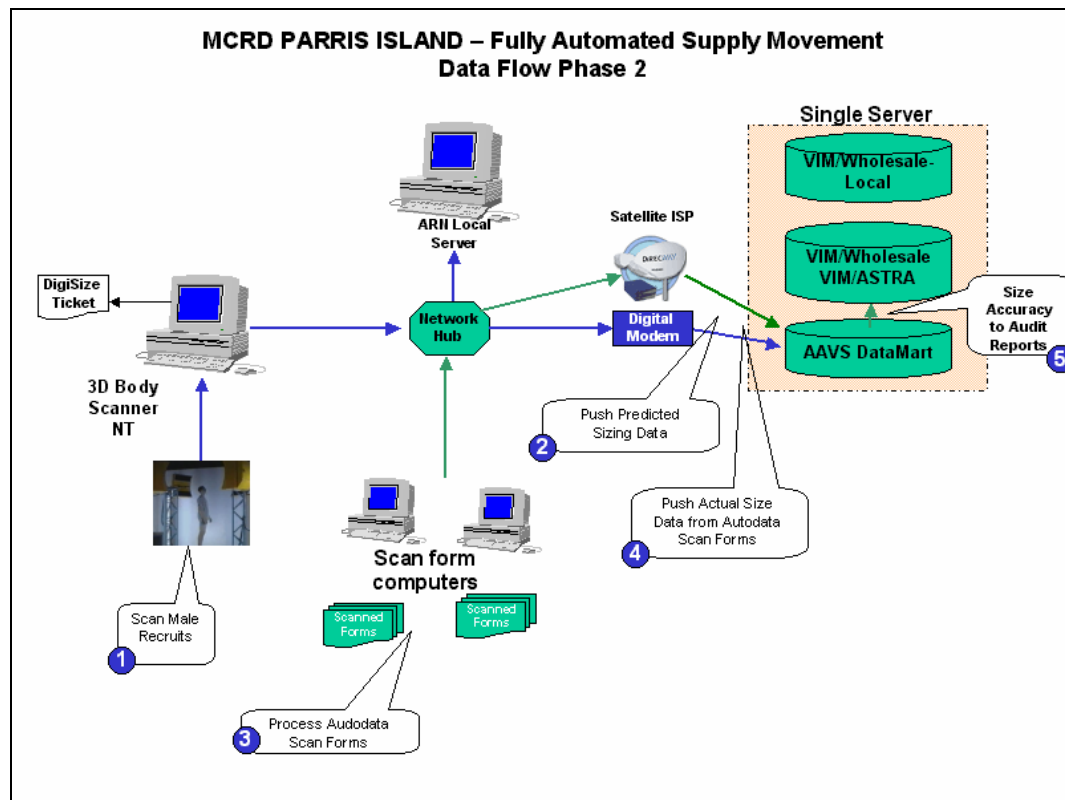
MCRD-PI will be responsible for conducting a Data Integrity Evaluation. During the 3 May 2002 Kick-Off meeting it was decided that the validation period would conclude on 30 September 2002 or until at least a minimum of 2000 individual recruit scans are compared to the scan form data. Due to the delay in the operational start date of scanning, the validation period will conclude on or about 31 October 2002.

AdvanTech, Inc will assist MCRD-PI in this evaluation by extracting, compiling, and providing size selection data from both the body scanner and the scan form data tables in a format conducive to analysis and evaluation. As summary of the size validation will be included under the Audit Reports module of VIM/Wholesale.

MCRD-PI will also be responsible for identifying any trends between the body scanner size selection and the results of the manual fitting process. MCRD-PI will capture the reasoning data, by SSN, when the body scanner size is exchanged for a different sized item. MCRD-PI has indicated that they will use the body scanner pick ticket to annotate

size changes and develop a reasoning code which MCRD-PI can add to the AdvanTech provided comparison report.

AdvanTech will extract data from the body scanner pick ticket table and the bar-coded scan form data tables and produce a comparison report for MCRD-PI manager personnel to review. The report will contain, at a minimum, exception information displayed by SSN comparing the NSN predicted by the body scanner and the NSN selected by the recruit on the bar-coded scan form. The report will also contain statistics on the number of scans performed, the number of items predicted and the variance rate between the body scanner size selected and the size selected during the manual fitting process. The report format will be designed in collaboration with MCRD-PI.

The compilation of the report will be initiated after the 02 Appointment male dress uniform issue bar-coded scan form is installed for MCRD-PI use. The target date is 20 September 2002.

 Body scanner size selection will be considered successful if the size selection predicted by the body scanner is within +/- 5% of the manual fitting size captured by the scan forms. It is projected that a minimum of 80 percent of male recruits will be scanned in order to achieve a true statistical sampling for this evaluation.

If the body scanner results meet the criteria for success, then the Body Scanner portion of Phase 3 will be initiated.

Phase 3 – Full integration of 3D body scanner data with AutoData Scan forms

MCRD PARRIS ISLAND – Fully Automated Supply Movement
Data Flow Phase 3
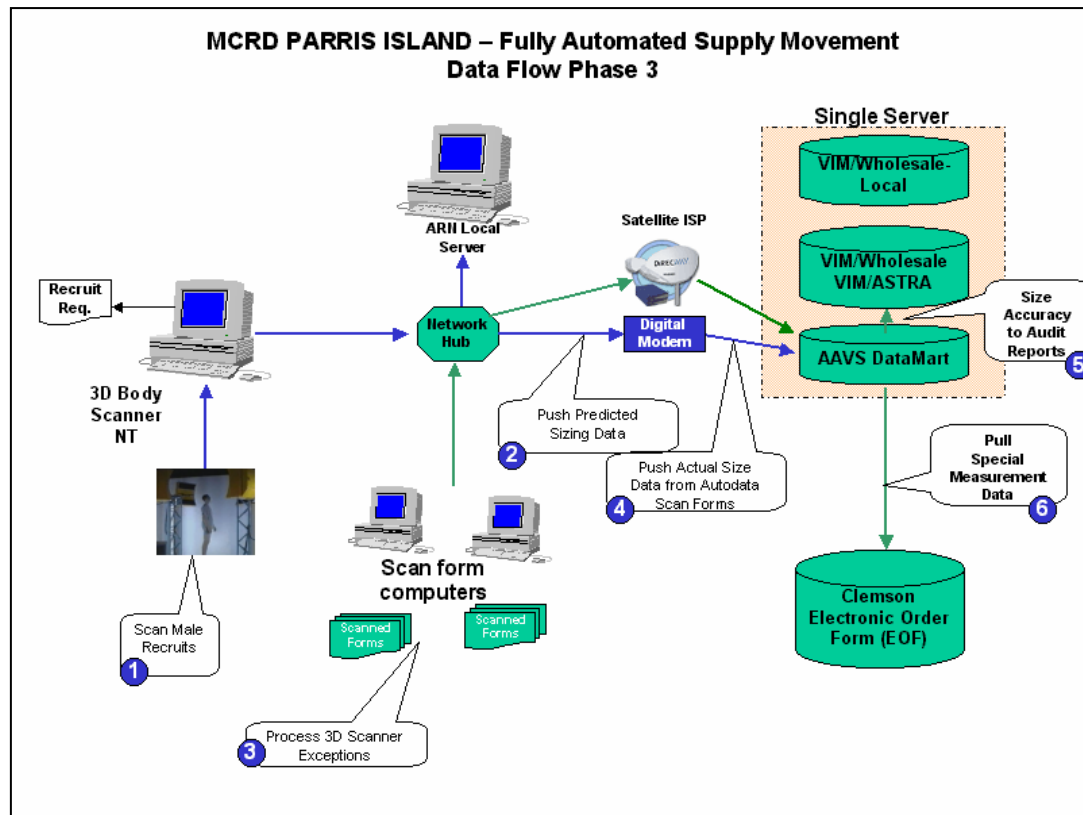
Phase 3 will fully integrate the size data from the 3D body scanner with the bar coded scan form into a single Recruit Requisition. These requisitions include the data from the DigiSize Pick Ticket with the size check boxes that currently are part of the optical scanning documents.

AdvanTech plans to integrate the special measurements from the 3D body scanner into the DLA/DSCP Electronic Order Form (EOF) System. This process will be coordinated with Clemson University because of their past involvement with the EOF projects. The formatted data will be pulled from the AAVS DataMart to Clemson. They would then integrate the data from that text file into their EOF interface program

Assuming the results of the sizing accuracy analysis meet the 5% targets, the plan will be to scan in only those Recruit Requisitions with size exceptions. Since the recruit has had his smart card read into the 3D body scanner system, there seem to be no reason to

optically scan all of the Recruit Requisitions in order to perform any type of audit to validate all recruits were in fact processed.

The anticipated result from this part of the integration project will be a physical reduction of up to 66% of the forms currently being optically scanned.

Network Requirements

Due to Marine Corps internal network security restrictions, both the QLM and DigiSize software packages must be installed on systems outside of the primary MCRD secure network. This necessitates the setup of a small local area network dedicated to support of the wholesale inventory management project. This network will connect the various computers used in inventory control, 2D and 3D scanning computers, as well the wireless HHT systems.

AdvanTech, Inc. will develop and maintain this network, though Cyberware will be responsible for the configuration and maintenance of the computers required for DigiSize operation. This local area network will use industry-standard 100-Base-T Ethernet interfaces and will connect to the open commodity Internet via digital cable modem and satellite connections to commercial ISPs. A firewall system will be employed to protect the local area network from unauthorized intrusion or disruption. Data will flow out to AAVS and other databases over the cable and satellite ISP links, and AdvanTech and Cyberware will have remote VPN access to the local area network for administration and troubleshooting purposes.

Hardware Description

The Cisco 1721 Modular Access Router is recommended as the interface between the wholesale issues LAN and the commodity Internet. The Cisco 1721, powered by the industry-standard Cisco IOS software, delivers high performance, security, and maintainability for small to moderate sized networks. The 1720 Modular Router series supports multiple WAN connection methods (cable, DSL, ISDN, T1, satellite) through the use of modular expansion cards called WICs (WAN Interface Cards). The 1721 model features two WIC slots, allowing the use of multiple uplink methods. This is required at MCRD-PI due to the desire to evaluate both digital cable and satellite Internet service. The Cisco 1721 will enable seamless switches between the two methods, controlled remotely by AdvanTech, in order to thoroughly evaluate performance of each option. In addition, if so desired the two uplinks can be configured for high-reliability fail-over operation such that Internet connectivity will be maintained even during the failure of one network uplink. The Cisco 1721 also offers all required router features for supporting the local area network, including NAT and DHCP services, a Cisco IOS

Stateful Inspection packet-filtering firewall, and support for hardware-encrypted triple DES Secure IP Virtual Private Networks (IPSec VPNs). VPN functionality enables secure remote access to all computers on the network from AdvanTech or Cyberware headquarters, allowing remote administration and maintenance of the local LAN. The IOS Firewall will allow local users safe access to the Internet while preventing unauthorized external users from gaining access to local resources, while also detecting and protecting against Denial-of-Service attacks.

Connection of multiple computers to the internal port requires a hub. The Linksys EtherFast 10/100 5 port hub is recommended, or comparable. Two linked hubs are suggested; one for the computers on the issue floor area, and a second hub for the computers in the upstairs office area. These two hubs will be connected via Ethernet, and the downstairs hub will further connect to the Cisco 1721 and thence to the Internet at large. This network topology was chosen with future growth in mind; the two 5 port hubs may be obtained for comparable cost to a single 8 port hub and provide greater flexibility for future expansion, as well as requiring only a single long cable run from the downstairs to upstairs rather than multiple. Standard Category 5 twisted pair Ethernet cables will be used to connect all computers, hubs, and routers for the local area network

X. Satellite Communications Technology

Overview

Reliable access to the Internet has proven to be one of the more difficult hurdles to overcome. ARN systems rely heavily on the VIM system to display the decision support tools necessary to manage the wholesale and wholesale local level inventories. In an attempt to circumvent the historical problems with wholesale local sites accessing the Internet through conventional means, ARN has decided to test out satellite communications technology as an alternative data transmission mechanism.

This will be even more important as the QLM/Local functionality is ported to a web-based application under the VIM menu structure. Real-time, on-demand access to the Internet will be essential to the successful implementation and use of this new VIM-Wholesale Local application.

The test will require parallel transmissions through both the DSL communications line and the satellite.

Implementation

The specifications incorporated in the selection process for the satellite are: (1) transfer rate better than 56K, (2) flat rate for unlimited access, (3) VPN compatible, (4) compatible with a router, (5) PC Anywhere compatible, and (6) static IP addressing.

AdvanTech, Inc. will coordinate with MCRD-PI Facilities Management for the installation of the dish on building 6007. The satellite manufacturer will be contracted for the actual installation of the equipment.

Application/Software Modifications

In order to transmit the data through both the SatCom link and the digital cable modem, the data will be split depending on the source. Data from the 3D body scanner will be transmitted via satellite. All other data will be transmitted via digital cable modem. Reliability will be validated by comparing the files size and records transmitted compared to the file size and records received.

The VIM Wholesale Local communications will also be modified so that the ASP pages are accessed only through the Satellite. This will be the test for downtime of the communications mechanism, and will further validate the speed of the satellite uplink.

Risks

None identified.

Data Flow
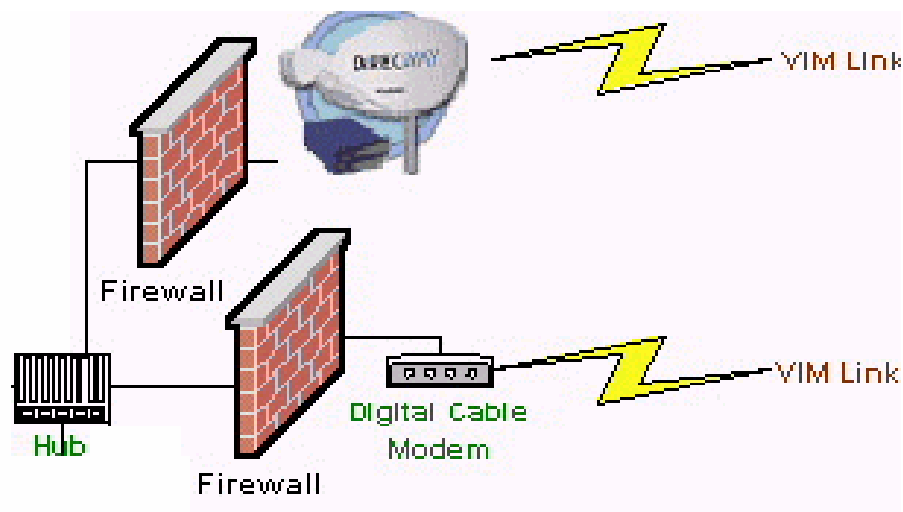
Network Requirements

None

Power Requirements

Industry standard eth card for access pt server (SATCOM system), UPS, 120v VAC

Hardware Description

Hardware Description	Model	Feature
Access Point	SATCOM	1.2 Meter Dish
Cable	Ethernet and coax cable.	
Operating System	Unix	
Router	Cisco 1721 Modular Access Router	
Hub	Linksys EtherFast 10/100 5 port hub	

Installation Requirements

SATCOM installation services will be utilized.

XI. Changes to Proposed Timeline

#	Task Description	Duration	Start	Finish	Predecessor	Resource
PI.1	Proj, Initial Site Visit and information gathering	10 days	6/27/2002 8:00	7/10/2002 17:00		Bob Padilla
PI.2	Proj, HHT Site evaluation	2 days	7/11/2002 8:00	7/12/2002 17:00	1	Carol Fraser
PI.3	Proj, Develop Functional Requirements	56 days	7/15/2002 8:00	9/30/2002 17:00	2	Bob Bona [50%], Carol Fraser [50%]
PI.4	Proj, Generate Implementation Report	45 days	7/22/2002 8:00	9/20/2002 17:00		Bob Bona [25%], Carol Fraser [35%], Bob Padilla [30%], Richard Perrin [10%]
PI.5	VIM/WL, Redesign Forms & Programs for Systems Functions	3 days	9/25/2002 8:00	9/27/2002 17:00	4	Bob Bona, Linda Zao

#	Task Description	Duration	Start	Finish	Predecessor	Resource
PI.6	VIM/WL, Modify User Login Criteria for HHT Logon	3 days	9/25/2002 8:00	9/27/2002 17:00		Bob Bona
PI.7	VIM/WL, Stock Movement	16 days	9/30/2002 8:00	10/21/2002 17:00	6	
PI.8	VIM/WL, Develop New Stock Movement Functions	3 days	9/30/2002 8:00	10/2/2002 17:00	6	Bob Bona, Linda Zao
PI.9	VIM/WL, Develop Recommended Stock Movement Report Based on Issues	1 day	10/3/2002 8:00	10/3/2002 17:00	8	Bob Bona, Linda Zao
PI.10	VIM/WL, Develop Interface for HHT Stock Movement Functions	3 days	10/4/2002 8:00	10/8/2002 17:00	9	Bob Bona, Linda Zao
PI.11	VIM/WL, Redesign Forms and Programs for Stockroom Functions	7 days	10/9/2002 8:00	10/17/2002 17:00	10	Bob Bona, Linda Zao
PI.12	VIM/WL, Test Stockroom Functions	2 days	10/18/2002 8:00	10/21/2002 17:00	11	Carol Fraser
PI.13	VIM/WL, Physical Inventory	11 days	10/22/2002 8:00	11/5/2002 17:00	12	
PI.14	VIM/WL, Redesign Forms and Programs for Physical Inventory Functions	7 days	10/22/2002 8:00	10/30/2002 17:00	12	Bob Bona, Linda Zao
PI.15	VIM/WL, Develop Interface for HHT Physical Inventory Functions	2 days	10/31/2002 8:00	11/1/2002 17:00	14	Bob Bona [50%], Linda Zao [50%]
PI.16	VIM/WL, Test Physical Inventory Functions	2 days	11/4/2002 8:00	11/5/2002 17:00	15	Carol Fraser
PI.17	VIM/WL, Receiving	13.25 days	11/6/2002 8:00	11/25/2002 10:00	16	
PI.18	VIM/WL, Redesign Forms and Programs for Receiving Functions	5 days	11/6/2002 8:00	11/12/2002 17:00	16	Bob Bona, Linda Zao
PI.19	VIM/WL, Design Due Member Forms and Programs	2.5 days	11/13/2002 8:00	11/15/2002 12:00	18	Bob Bona, Linda Zao
PI.20	VIM/WL, Design New QDR Forms and Programs	2.5 days	11/15/2002 13:00	11/19/2002 17:00	19	Bob Bona [50%], Linda Zao [50%]
PI.21	VIM/WL, Develop Interface for HHT Receiving Functionality	1.25 days	11/20/2002 8:00	11/21/2002 10:00	20	Bob Bona, Linda Zao
PI.22	VIM/WL, Test Receiving Functions	2 days	11/21/2002 10:00	11/25/2002 10:00	21	Carol Fraser
PI.23	VIM/WL, Inventory	7 days	11/25/2002 10:00	12/4/2002 10:00	22	
PI.24	VIM/WL, Redesign Forms and Programs for Inventory Functions	5 days	11/25/2002 10:00	12/2/2002 10:00	22	Bob Bona [25%], Linda Zao

#	Task Description	Duration	Start	Finish	Predecessor	Resource
PI.25	VIM/WL, Test Inventory Functions	2 days	12/2/2002 10:00	12/4/2002 10:00	24	Carol Fraser
PI.26	VIM/WL, Purchasing	5.88 days	12/4/2002 10:00	12/12/2002 9:00	25	
PI.27	VIM/WL, Redesign Forms and Programs for Purchasing Functions	4.88 days	12/4/2002 10:00	12/11/2002 9:00	25	Bob Bona [50%], Linda Zao
PI.28	VIM/WL, Test Purchasing Functions	1 day	12/11/2002 9:00	12/12/2002 9:00	27	Carol Fraser
PI.29	VIM/WL, Reports	13 days	12/12/2002 9:00	12/31/2002 9:00	28	
PI.30	VIM/WL, Redesign and Create new Forms and Programs for Report Functionality	10 days	12/12/2002 9:00	12/26/2002 9:00	28	Bob Bona [50%], Linda Zao
PI.31	VIM/WL, Redesign Transaction Register to Accommodate Physical Inventory and Stock Movement Data	2 days	12/26/2002 9:00	12/30/2002 9:00	30	Bob Bona [50%], Linda Zao [50%]
PI.32	VIM/WL, Test New Transaction Register	1 day	12/30/2002 9:00	12/31/2002 9:00	31	Carol Fraser
PI.33	VIM/WL, Online Help/UM Development	24 days	12/31/2002 9:00	2/3/2003 9:00	29	Carol Fraser [50%]
PI.34	VIM/WL. Software Integration Testing	4.5 days	2/3/2003 9:00	2/7/2003 14:00	33	Carol Fraser
PI.35	VIM/WL, Train Users on New Functions	1 day	2/7/2003 14:00	2/10/2003 14:00	34	Bob Padilla, Debra Wassel
PI.36	VIM/WL, Perform Parallel Testing at Client Site	5 days	2/24/2003 8:00	2/28/2003 17:00	35	Debra Wassel, Bob Padilla
PI.37	VIM/WL, Transfer Data and Go Live	4 days	3/3/2003 8:00	3/6/2003 17:00	36	
PI.38	VIM/WL, Gain User Sign Off	0.25 days	5/15/2003 8:00	5/15/2003 10:00		Richard Perrin
PI.39	HHT, HHT RS Development	11 days	9/5/2002 8:00	9/19/2002 17:00		Carol Fraser
PI.40	HHT, Program HHT System Controls	10 days	9/20/2002 8:00	10/3/2002 17:00	39	HHT Contractor
PI.41	HHT, Program New Stock Movement Functions	15 days	10/22/2002 8:00	11/11/2002 17:00	7	HHT Contractor
PI.42	HHT, Test New Stock Movement Functions	2 days	11/12/2002 8:00	11/13/2002 17:00	41	Carol Fraser
PI.43	HHT, Program HHT Receiving Modifications	10 days	11/25/2002 10:00	12/9/2002 10:00	17	HHT Contractor
PI.44	HHT, Test HHT Receiving Functions	2 days	12/9/2002 10:00	12/11/2002 10:00	43	Carol Fraser

#	Task Description	Duration	Start	Finish	Predecessor	Resource
PI.45	HHT, Program New Physical Inventory Functions	15 days	11/6/2002 8:00	11/26/2002 17:00	13	HHT Contractor
PI.46	HHT, Test HHT Physical Inventory Functions	2 days	11/27/2002 8:00	11/28/2002 17:00	45	Carol Fraser
PI.47	HHT, Test Security Parameters of RF HHT functions	1 day	10/4/2002 8:00	10/4/2002 17:00	40	Carol Fraser
PI.48	HHT, Software Integration Testing	2 days	11/29/2002 8:00	12/2/2002 17:00	46	Carol Fraser
PI.49	HHT, Installation of RF Network at Client Site	5 days	12/3/2002 8:00	12/9/2002 17:00	48	Carol Fraser
PI.50	HHT, Implement HHT Receiving	1 day	12/10/2002 8:00	12/10/2002 17:00	49	Carol Fraser
PI.51	HHT, Implement HHT Physical Inventory	1 day	12/11/2002 8:00	12/11/2002 17:00	50	Carol Fraser
PI.52	HHT, Implement HHT Stock Movement	1 day	12/12/2002 8:00	12/12/2002 17:00	51	Carol Fraser
PI.53	HHT Documentation Updates	5 days	11/29/2002 8:00	12/5/2002 17:00	46	Carol Fraser
PI.54	Scan Forms, Extract Data from Legacy Recruit Data	5 days	6/17/2002 8:00	6/21/2002 17:00		Debra Wassel
PI.55	Scan Forms, Integrate Card Swipe for Night Room Issue	10 days	6/24/2002 8:00	7/5/2002 17:00	54	Debra Wassel
PI.56	Scan Forms, Reformat Forms to include recruit data	45 days	7/8/2002 8:00	9/6/2002 17:00	55	Debra Wassel [50%]
PI.57	Scan Forms, Map Tables and Modify Conversion and Data Editing Programs	45 days	7/8/2002 8:00	9/6/2002 17:00		Debra Wassel [50%]
PI.58	Scan Forms, Develop Cabinet NG Interface	5 days	9/9/2002 8:00	9/13/2002 17:00	57	Sam Hsien-Hsiu Yen
PI.59	Scan Forms, Test Cabinet NG Interface	2 days	9/16/2002 8:00	9/17/2002 17:00	58	Carol Fraser
PI.60	Scan Forms, User Documentation	3 days	9/18/2002 8:00	9/20/2002 17:00	59	Debra Wassel
PI.61	Scan Forms, System Integration Testing	3 days	9/23/2002 8:00	9/25/2002 17:00	60	Carol Fraser, Debra Wassel
PI.62	Scan Forms, User Training	1 day	9/26/2002 8:00	9/26/2002 17:00	61	Debra Wassel
PI.63	SAT, Satellite Communications Technology	8 days	11/18/2002 8:00	11/27/2002 17:00		
PI.64	SAT, Coordinate Procurement and Installation of Equipment	5 days	11/18/2002 8:00	11/22/2002 17:00		Bob Padilla
PI.65	SAT, Parallel Testing of Communications Transmissions	3 days	11/25/2002 8:00	11/27/2002 17:00	64	
PI.66	3D, Concept and Design	106 days	6/17/2002	11/11/2002		

#	Task Description	Duration	Start	Finish	Predecessor	Resource
			8:00	17:00		
PI.67	3D, Design Concept and Operational Process Flow	5 days	6/17/2002 8:00	6/21/2002 17:00		Marshall Perrin, Richard Perrin
PI.68	3D, Develop 3D Body Scanner Technical Specifications	15 days	6/24/2002 8:00	7/12/2002 17:00	67	Marshall Perrin, Richard Perrin
PI.69	3D, Determine Linkages Between Scanner and ARN Systems and ARN Networks	3 days	7/15/2002 8:00	7/17/2002 17:00	68	Marshall Perrin, Richard Perrin
PI.70	3D, Develop Sizing Tables	75 days	7/18/2002 8:00	10/30/2002 17:00	69	Marshall Perrin [10%]
PI.71	3D, Develop Validation Criteria for Size Data	8 days	10/31/2002 8:00	11/11/2002 17:00	70	Bob Bona [25%]
PI.72	3D, Smart Card	5 days	9/30/2002 8:00	10/4/2002 17:00		
PI.73	3D, Interface the Smart Card to the Pick Ticket	5 days	9/30/2002 8:00	10/4/2002 17:00		3D Contractor
PI.74	3D, Technology Report	9 days	9/16/2002 8:00	9/26/2002 17:00		
PI.75	3D, Develop and Submit 3D Body Scanner Integration Assessment Report	9 days	9/16/2002 8:00	9/26/2002 17:00		Bob Bona [25%], Carol Fraser [25%], Bob Padilla [40%], Richard Perrin [10%]
PI.76	Project, Post Go Live Support	76 days	3/3/2003 8:00	6/14/2003 17:00	62	
PI.77	Post Go Live, Operator Training	5 days	3/3/2003 8:00	3/7/2003 17:00		Debra Wassel, Bob Padilla
PI.78	Post Go Live, Inventory Management	50 days	4/8/2003 8:00	6/14/2003 17:00	77	Bob Bona [10%], Bob Padilla [25%], Debra Wassel [25%]
PI.79	Post Go Live, ESOC Processing	5 days	3/3/2003 8:00	3/7/2003 17:00		Carol Fraser, Debra Wassel, Bob Padilla
PI.80	Post Go Live, Implement Detailed Audit Reports	10 days	3/3/2003 8:00	3/14/2003 17:00		Bob Padilla
PI.81	Post Go Live, Implement Recommended Stock Movement Report	2 days	3/3/2003 8:00	3/4/2003 17:00		Bob Padilla
PI.82	Project, Interim Progress Report	239 days	6/17/2002 8:00	5/15/2003 17:00		
PI.83	Project, Contract Funds Status Report	218 days	7/4/2002 8:00	5/5/2003 17:00		
PI.84	Project, Contract Funds Status Report 1	1 day	7/4/2002 8:00	7/4/2002 17:00		Bob Bona [50%], Stacey Jones [50%]

#	Task Description	Duration	Start	Finish	Predecessor	Resource
PI.85	Project, Contract Funds Status Report 2	1 day	8/5/2002 8:00	8/5/2002 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.86	Project, Contract Funds Status Report 3	1 day	9/4/2002 8:00	9/4/2002 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.87	Project, Contract Funds Status Report 4	1 day	10/4/2002 8:00	10/4/2002 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.88	Project, Contract Funds Status Report 5	1 day	11/4/2002 8:00	11/4/2002 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.89	Project, Contract Funds Status Report 6	1 day	12/4/2002 8:00	12/4/2002 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.90	Project, Contract Funds Status Report 7	1 day	1/6/2003 8:00	1/6/2003 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.91	Project, Contract Funds Status Report 8	1 day	2/4/2003 8:00	2/4/2003 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.92	Project, Contract Funds Status Report 9	1 day	3/4/2003 8:00	3/4/2003 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.93	Project, Contract Funds Status Report 10	1 day	4/4/2003 8:00	4/4/2003 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.94	Project, Contract Funds Status Report 11	1 day	5/5/2003 8:00	5/5/2003 17:00		Bob Bona [50%], Stacey Jones [50%]
PI.95	Project, Final Technical Report	10 days	6/3/2003 8:00	6/14/2003 17:00		Bob Bona [25%], Carol Fraser [25%], Bob Padilla [25%], Richard Perrin [25%]

XII. Cost Change Recommendations

This section will be forwarded to applicable Program Management personnel.

XIII. Summary Recommendations

The comprehensive requirements outlined in this technology report should be incorporated into the MCRD-PI supply chain management process. In so doing, DLA will be able to demonstrate that efficiency improvement and cost reduction opportunities exist and can be exploited through the interfacing of all ARN initiatives as a single supply chain management solution.

Appendix A

– CabinetNG to AutoData Scan Form RS, Draft – Separate Attachment

Appendix B

– RF Site Survey Results, Draft – Separate Attachment

Appendix C

– HHT RS, Draft – Separate Attachment

Appendix D

– Modifications

Appendix A

CabinetNG to AutoData Scan Form RS

Requirements Control Group:	**CabinetNG**
Function:	**Automatic Filing of Issue Scan Form tif to CabinetNG**
Application:	**Issue Scan Forms**
Customer:	**ARN**
Hardware Platform	**Non-specific**
CabinetNG and AutoData Software	**CabinetNG v4.2, Scannable Office**
Development Tools	**Visual Basics**
Test Site:	**Parris Island**
Date Approved:	

I. Background

Project Parameters:

Project Identification

Software Title: CabinetNG Interface to AutoData
Current Version #:   0.0
Target Version #:   1.0

Project Dates

Target Start Date: 3 September 2002
Actual Start Date: 16 September 2002
Target Readiness Date: 18 September 2002
Scheduled Deployment Date: TBD

Scope Parameters:

Project Type: Enhancement new Interface
Software Type: Software Component
Desired Quality: Commercial
Target Iteration Size: Small (2 weeks)
Iteration Path: Formal

General Project Definition:

Using the COTS vendors tools, AdvanTech will program an interface whereby a routine will open CabinetNG, Select the Recruit Issues filing cabinet, Open or Create the Platoon filing folder, select the appropriate folder tab and save the scanned issue form image (tif) to the correct tab.

There are 20 forms at MCRD-PI, 14 forms at MCRD-SD, and an estimate of 8 forms for each of the Army CIIPs. These forms will be filed in specific Filing Groups within each platoon folder. The form Filing Group and the form specification will be designated in the Form Master table within Access. The interface will relate the form number scanned to the Filing Group designation and send the form image to the correct folder and filing group.

Business Justification:

This project will eliminate the need for costly storage space currently required for the filing and storage of thousands of recruit issue forms. Forms will be electronically stored and will be easily archived and retrieved upon demand.

Project Scope Definition:

Version 1:   AutoData application routine will save a scanned form as a tif; will rename the tif to comply with the naming convention specified; will automatically open/create the correct platoon folder; will select the appropriate filing group; and save the document in the correct filing group. Users will manually create the document filing group if a form is added.

Version 1.5:   The AutoData application will be enhanced with the capability to: (1) automatically convert the tif file to a DMX format (in order to save storage space); and (2) automatically create a document filing group based on the forms table update process.

Critical Success Factors:

Project must be completed NLT 15 October 2002.

Project must require NMT 50 development hours. (20 hours for development, 20 hours for test and documentation, 5 hours for rework and 5 hours for retest.)

Filing of image cannot slow the process of scanning and data capture.

Risk Factors:

There may be a resource constraint to program the VB scripts.

Schedule may slip if resource constraint isn't resolved quickly.

Storage capacity is a potential risk if users are not able to electronically archive to a CD at least quarterly.

CDRW drive is required.

Workstations must have licensed copies of Microsoft Access and AutoData.

Server must have at least 6 GB of memory. (12 GB are recommended.)

Testing on a workstation using XP will not be performed.

End User Description:

Scans/Day = 500

2-4 users scanning simultaneously

End users will not have administrative privileges to delete records.

Storage: (1) 500 tif/day **X** 200 days/year = 100,000 documents/year
20,000 documents require 1 GB of memory
100,000 / 20,000 = 5 GB of memory

II. Functional Scenario:

Using the COTS vendors tools, AdvanTech will program an interface whereby a routine will open CabinetNG, Select the Recruit Issues filing cabinet, Open or Create the Platoon filing folder, select the appropriate folder tab and save the scanned issue form image (tif) to the correct tab.

There are 20 forms at MCRD-PI, 14 forms at MCRD-SD, and an estimate of 8 forms for each of the Army CIIPs. These forms will be filed in specific Filing Groups within each platoon folder. The form Filing Group and the form specification will be designated in the Form Master table within Access. The interface will relate the form number scanned to the Filing Group designation and send the form image to the correct folder and filing group.

III. Current Process:

Each recruit is processed through the clothing issue section of Recruit Training Centers. Recruits typically are processed through 3 to 4 different clothing issue days. These issue days can require 1 or more issue forms in order to complete the issue transaction to a recruit.

During these issue days recruits are measured for and issued different uniform items, and they are also issued non sized personal items, i.e. laundry bags, towels etc. Once an item is issued the size of the item is annotated on a form and the quantity of each type of item is recorded, i.e. 2 pairs of size 6.5 wide boots.

Currently these forms are then manually keyed into an application that captures the issue data, and the hardcopy of the form is filed and eventually stored for 2 years (Army). Clothing personnel are sometimes required to verify quantities and sizes on the filed forms, which mean forms are filed in the office. This takes up a tremendous amount of space.

IV. New Process:

The future functionality will incorporate (1) an automated process whereby the issue forms are scanned into an Access Database, (2) a copy of the form will automatically be filed in a document management application, and (3) a file will be created which will be used to interface the issue data directly into an issue application.

V. AutoData Tables and Scripts:

SD = D:/QLM1 (Current SD on Grand Central)
PI = D:/QLM (Current PI on Grand Central)
Note: Access tables used for populating the bar codes and collecting the scanned data are located on C:\program files\recruit smart card reader\recruits mdb. (The following tables are in "recruits.mdb" Access Database: issuefrm 1-11, recruitdata, tblRecruit, and scannedforms.
Access tables that will be used to process the scan form data and create the J0a files are located in H:\qlm_pi\worktables.mdb:

Tables converted from Pdox to Access:
Import Data Folder:
form01bar – form04bar (No longer used, deleted)
issuefrm001 – issueform010 (converted to access)

Work Tables:
Errorcheck (Wrong Qty Issue)
Errorchecknsn (Wrong NSN)
Forms(list all forms at the location bar coded and non-bar coded)

Global(list data pertinent to a location)
Importmaster(list forms#, formname and formpath)
issuetrn1(stores individual recruit data from scanned forms for processing issues)
mappedfiles(lists all forms that have been mapped)
mastcat_dscp(contains all of NSN's listed for DSCP)
ms_outgoing (contains information concerning the Joa's processed)
nsnmapper(lists all the nsn on the scan forms and their field values for editing the forms)
Pgc (lists all PGC's for DSCP)
Pgcstdissue(list standard issue per pgc and scan form, used during edit process)
Platoons (used for bar code printing of scan forms)
Platoonssn
Recruitmaster (used to check updated recruit data from smart card or RASPAS)
Stckroom(list data pertinent to a location
stk_docnum(tracks document numbers for J0a transactions)
termaccess (indicates processing access within control panel)
termID (used to identify a system for access on control panel)
typecodes (used to relate issues with FANs and Cost Centers for creation of J0a's)
Forms Master (lists all non barcoded forms)
Workmaster(used to keep track of unprocessed forms in control panel)

SCRIPTS and FORMS
Scanformmenu (control panel opens print scanforms. Control Panel runs the other scripts from a single panel.)

convertscanneddata (User selects step 1 button on control panel) This script checks the data collected from the scanned forms in the issuefrm tables against the default values in the nsnmapper and pgsstdissue tables and presents a form for editing of erogenous entries when needed. The user is required to make manual correction of the data in question by entering the correct data in the spaces provided on the form. Once all the data has been processed it is then transferred to the issuetrn1 table for use with step 2 on the control panel.

build MILSTRIPS from Scanned Data (User selects step 2 button on control panel) This script utilizes the data placed in the issuetrn1 table from step 1. Key field values are checked which indicate the data has not been processes the data is transferred to a table including the data needed to create the J0a step for use in Step 3 on the control panel.

Process Issues (User selects step 3 button on control panel.) At SD this script retrieves the data from their QLM Retail system processes and placed it in the same table as the scanforms with the added J0a data. The J0a text file is created. The issuetrn1 table is reviewed based on a date limit of 90 days and

data older the 90 days is deleted. Finally the J0a data and issuetrn1 table are ftp'd to QLM central for processing.

readsmartcard (This is a form with attached scripts. This form is only being used at SD night room at this time. The recruit swipes his smart card in the reader and the data is collected into the recruits access table. The number of card reads are stored in the cardread table, summed and displayed on the screen. The print button is then pressed and the nigtroombar1 form is open in MSword with the smart card data in the bar coded fields. The user then presses the merge to document button on the tool bar in MSWord and all the forms are processed for printing. The user then presses the print button on the tool bar in MSWord and the forms are printed. Once all the forms are printed the user closes MsWord not saving any changes. This action initiates a confirm window asking if all the forms printed? The user then presses the Done button initiating a window asking if the data should be deleted, (presently at SD the data is being deleted once the forms have been printed), the user selects yes and the form closes.

Print Scanforms This is a form with scripts attached use to update the latest data downloaded from RASPAS system at SD. Once the script has made all the needed checks the new data is placed in a pre-designed excel spreadsheet for use with the scan forms. The user is required to select from three fields depending on number of forms needed printing. These fields are platoon, form number and (SSN if printing one form). The Print button is pressed and the forms are processed using MSWord. Once all the forms are printed the user closes MSWord not saving changes.

editscanneddata This is a form that is presented when a discrepancy is noted during the convertscanneddata process. User intervention is required to make needed corrections.

VI. Process Diagram:
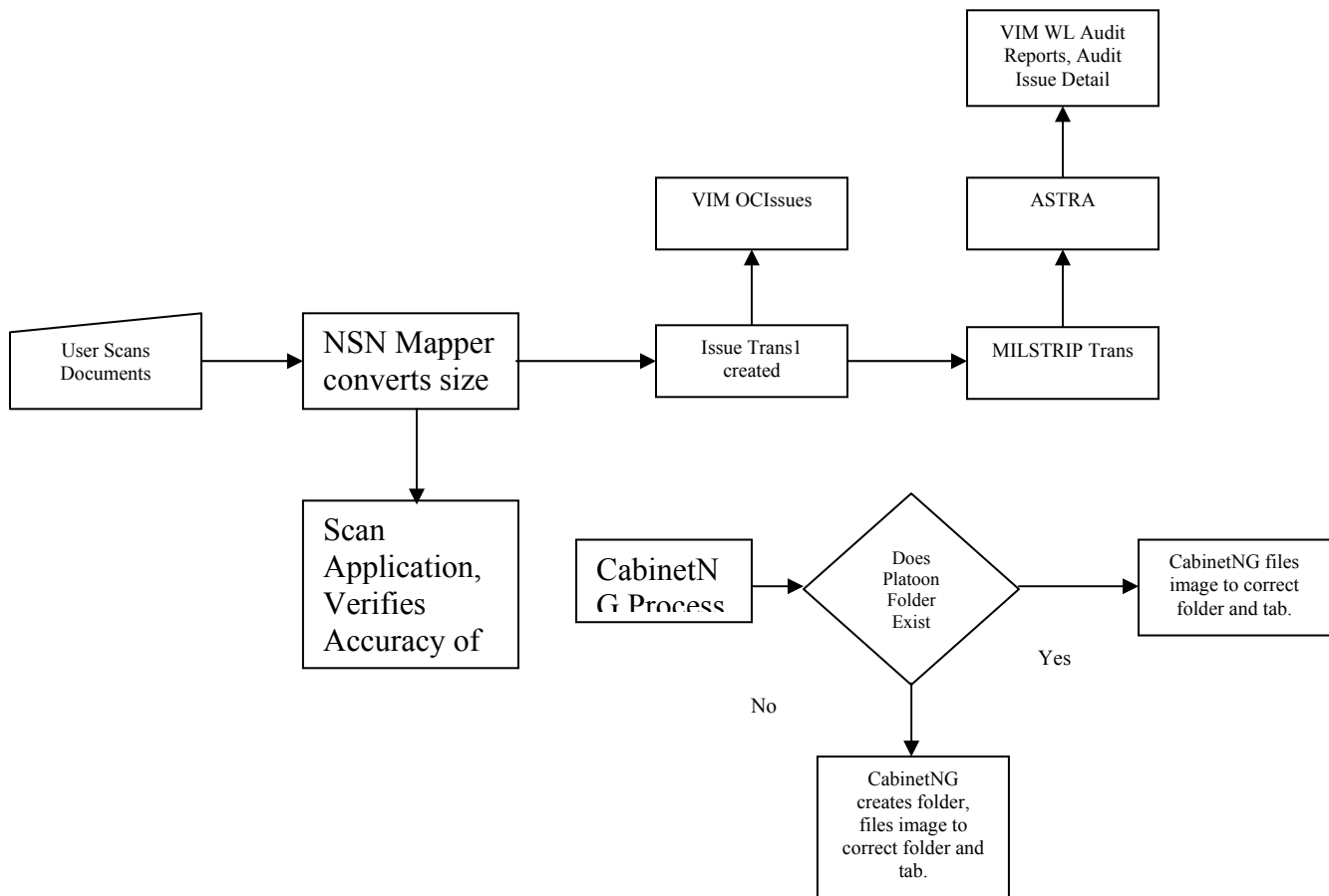
VII. System Specifications, CabinetNG Interface:

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
CabNG / AutoData	1	AutoData		1.7.A.01	The system shall allow a user to scan 1 or more forms in a single scanning session and capture a tif image.
CabNG / AutoData	1	AutoData		1.7.A.02	The system shall allow 1, 2, 3, or 4 users to scan and save images simultaneously.
CabNG / AutoData	1	AutoData		1.7.A.03	The system shall save a tif file of each form scanned.

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
CabNG / AutoData	1	AutoData		1.7.A.04	The system shall rename the tif file with the last 4 of the SSN, the last name of the recruit, the first name of the recruit, the form number scanned, the platoon number, and the date scanned. We presently save the complete ssn form number and platoon. We do not add the first name and the last name is only a label for use in distributing the forms. Name can be pulled from Recruit Master Table using SSN
CabNG / AutoData	1	CabNG Functions		1.7.B.01	The system shall automatically resize the tif file to a dmx file type.
CabNG / AutoData	1	CabNG Functions		1.7.B.02	The system shall file the renamed tif to the correct cabinet, folder and tab in Cabinet NG
CabNG / AutoData	1	CabNG Functions		1.7.B.03	If a folder does not exist for the platoon/fiscal year, the system shall create a folder with index for platoon number and Fiscal Year
CabNG / AutoData	1	CabNG Functions		1.7.B.04	Users can search for a specific platoon in CabinetNG
CabNG / AutoData	1	CabNG Functions		1.7.B.05	Users can search for a specific recruit's issue form
CabNG / AutoData	1	CabNG Functions		1.7.B.06	Users can view a specific recruit's issue form
CabNG / AutoData	1	CabNG Functions		1.7.B.07	Users can reprint a specific recruit's issue form
CabNG / AutoData	1	CabNG Functions		1.7.B.08	Users can archive Platoon folders
CabNG / AutoData	1	CabNG Functions		1.7.B.09	Users can write archived folders to a CD
CabNG / AutoData	1	CabNG Functions		1.7.B.10	Users can access folders and view specific recruit issue forms from the archived CD
CabNG / AutoData	1	Operating Systems		1.7.C.01	Programs should operate in Windows 2000
CabNG / AutoData	1	Operating Systems		1.7.C.02	Programs should operate in Windows NT 4.1
CabNG / AutoData	1	Operating Systems		1.7.C.03	Programs should operate in Windows XP

VIII. Hardware Requirements:

Workstation:
Pentium II or higher
15 MB free hard disk space
32 MB RAM
Recommend True Color 16-bit or higher Graphics resolution
CDRW Drive
Server:
Pentium II or higher
6 GB free hard drive space initially. (Recommend 12 GB.)

Appendix B

Symbol, RF Site Survey

Spectrum24™

Site Survey Report for

AdvanTech

Attention: Carol Fraser

Site Surveyed:

> Marine Corps Recruit Depot (MCRD)
> Parris Island, SC

Survey Date: July 15, 2002

Date of Report: July 19, 2002 (Revised)

Survey Performed by: Wayne Brown

For more information, please contact:

Account Manager: Wayne Brown
Telephone: 804-527-2852
Fax: 413-604-9586
Email: brownent@attbi.com

Report Contents

Radio Site Survey Overview

The radio site survey is a process by which test data is collected and used to determine hardware requirements needed to achieve **reliable RF propagation.** This enables use of the selected mobile devices in the areas required.

Data is collected by establishing two-way radio communications via a stationary and mobile unit at various points within a facility at **2.4 GHz,** utilizing the direct sequence method. Test units consisted of a Symbol Site-Survey utility with PC Card and a Spectrum24 Access Point with two external antennas. Testing is performed with a free running program that constantly transmits, checks, and echoes data packets between the two units. Results are continuously displayed to provide instantaneous feedback. The mobile unit is moved throughout the area to be covered and results analyzed to determine the placement and quantity of equipment required to provide the required, reliable RF propagation zone. The focus is on acceptable packet receipt verses signal strength alone.

Installation Considerations

Network Considerations

Computer Pro's is not responsible for the integrity of the underlying network to which the Access Points will be attached, the impact of additional expansion, or increased stock levels.

Electrical Installation Guidelines

Symbol equipment is designed to work on generally available AC. However, like all electronic equipment, its performance is subject to degradation due to some commonly inherent or random electrical problems or disturbances.

This report in no way implies or warrants that electrical problems will not present themselves at some future time.

Electrical installation alternatives are listed as **most** desirable to **least** desirable.

Isolated ground circuit with an on-line, uninterruptible power supply (UPS) which will also act as a filter and surge suppresser.

Isolated ground circuit with a surge suppresser.

Dedicated circuit with a UPS.

Dedicated circuit with a surge suppresser.

Non-dedicated circuit with a UPS.

Non-dedicated circuit with a surge suppresser.

Items 1 through 4 are recommended for a Network Controller Unit if present in your configuration. Deviation from one of these options can cause loss of data being transmitted.

Configurations 5 and 6 are not recommended. Due to the nature of a non-dedicated circuit, which has open receptacles, the load and type of use cannot be predicted at the time of installation. While the current draw of the Access Points is minimal, other devices on the circuit can affect them. If it is absolutely necessary to have a non-dedicated circuit, we recommend that the circuit **not** support:

Any hard wired devices

Any devices with components intended or known to produce heat e.g., space heaters, laser printers, heat guns, soldering irons, photocopiers.

Any devices prone to causing sudden sharp surges in the power line or which contain medium or large motors, e.g., electric staplers, refrigerators, floor cleaning equipment, air conditioners, fans, drills.
Any single device drawing more than 20% of the rated value of the circuit
Any combination of devices drawing more than 60% of the rated value of the circuit
In all cases the power to the Access Points must be unswitched and available 24 hours per day. It is recommended that the power never be provided from an Energy Management System.
The input power requirements are:
2mb   FH Spectrum 24 Access Point: 115v ~0.4A or 230v ~0.2A
11mb DS Spectrum 24 Access Point: 115v ~1.0A or 230v ~0.5A.
Other Environmental Considerations
Apart from building configuration, interior usage, and electrical considerations, there are other elements that might impact the performance of your system and that should be considered in your choice of equipment. These include:
Ambient temperature ranges
Dust, dirt, humidity, and weather elements
Planned usage, e.g. light commercial vs. industrial
Location susceptibility to lightning and/or power fluctuations

General Recommendations
Access Points
A 110 VAC surge suppresser outlet is recommended for Access Point power. The minimum requirements are 24 hour and clean. (See Electrical Installation Guidelines).
For maintenance purposes, all Access Points and shelves could be mounted no more than 10 feet above finished floors, unless the customer directs another height. If Access Points and shelves are mounted above 10 feet, it is necessary to bring down the Access Point for service. In this case, the customer must bring the Access Points down when service is necessary, or provide a lift to maintenance personnel.
Feed Line/Data Cable
Cabling should be run at ceiling level.
Cabling should have a minimum three (3) foot clearance from existing AC power cables. **Do not install data cable runs in parallel within existing AC conduit.**
Cable should conform to IEEE standards for the type of cabling specified.
If an RF Control Unit or Gateway is to be used, allow an additional fifty feet (50) of cable for ease in any future relocation.
Antennas
Maximum clearance should be maintained around antennas. Minimum recommended clearance is three (3) feet.
Special Notes
To aid in locating the components of your Spectrum24 system once installed, keep a copy of this report in the computer room to be made available to any service technicians or electricians who may be doing work in your facility.

Warranty of Coverage

The Computer Pro's Site Survey results reported herein are warranted by the Seller for one (1) year from Site Survey Report date to provide 100% RF coverage in areas designated by your representative and marked in Attachment C, Site Plan. This warranty applies if the equipment enumerated therein is installed, configured, and tested per this report, and there are no changes to the facility's structure, parameters within the building, or addition of RF device types other than those surveyed for use. Such changes may create the need for an additional survey of the site for an additional fee. This warranty applies only to coverage for those RF device types specified herein; these reflect the device types designated on the Buyer's Site Survey Request form. This warranty is limited to RF coverage and does not provide any explicit or implied guarantee relating to other Network Design parameters; such as, but not limited to: optimum network speed, data throughput, fault tolerance, redundancy, etc.
If any defect within this warranty appears and Buyer notifies Seller within the warranty period, Seller shall take necessary steps to resolve the issue within a reasonable time frame. These steps will include arranging for and performing a new survey of the site. Should this re-survey find coverage shortfalls in the equipment specified, Seller will provide a revised Site Survey report and provide any labor necessary to move existing, and/or install additional, equipment as specified in the revised report. Buyer is responsible for the purchase and provision of any additional equipment required. Should this re-survey find that the system was not installed in accordance with the specifications shown in this Site Survey report, Seller reserves the right to invoice the Buyer at current rates for the time spent in troubleshooting the installation plus expenses.

Surveyor's Findings

The MCRD Depot Clothing will require 5 Access Points to provide 2mb, 5.5mb, and 11mb DS FH 2.4ghz RF coverage at 5 separate issuing buildings. Symbol Access Points, Model AP4131 will provide this service. 4 of these Access Points will be powered via DC power (supplied power-over-ethernet). The 4th will be direct AC powered. Equipment will be mounted, as noted in the "Equipment Placement Section" of this report, using a Symbol mounting bracket. All Access Points will have been up-revved to the latest firmware v3.5, segmented by DS channel, and optimized for Symbol mobile unit RF activity.
The network topology will be a flat network dedicated to the RF project and one specific application. Potential RF coverage areas include 100% of each building. However, the wireless QLM application only requires coverage in 75% of Building 6007, 100% of Building 694, 695, 50% of Building 927, and 25% of Phase 1 Issue Building. Additional Access Points may be placed as business processes and wireless applications dictate.
The survey was conducted based on the potential use of SPT1846, potential future use of other Symbol wireless handheld terminals, or VoiP Wireless Phones over the same backbone.
During the RF testing, all clothing storage areas were at 60% stock levels. As a result, we required a higher level of RF data packet success for these storage areas in an attempt to quantitatively counter

non-peak stockage levels. There is no guarantee that this methodology will provide acceptable levels of RF coverage during 100% stock levels.

Radio Site Survey Results

The mobile coverage needed at this site can be achieved through installation of a Spectrum24 radio system with 6 Access Points. This system needs to be installed per the considerations above and the attachments below.
Attachment A: Hardware Required
Attachment B: Proposed 11mb RF Coverage

Equipment Placement

Access Point (UAP) # 1 Bldg 6007

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Dry Wall*	Mounted To *Wall*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 1
Access Point# to HUB Body Scan	Cable Type: *10 Base T*	CAT5 Distance: 200'
Notes: Mount to the right of doorway in Phase II issue room, below electrical conduit. 1st Floor: provides RF coverage to 95% of 1st Floor. 85 % of this area is at 11mb throughput, 5% at 5.5mb, 5% at 2mb. No coverage in South lobby, elevators, mechanical electrical room. 2nd Floor: provides RF coverage to 100% of Administration area and South entry. The remaining areas were not surveyed.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Dry Wall*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *Wall*	Alignment *Inverse Mounted*
Ceiling Height 50 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 2 antennas mounted on both sides of the AP approx. 3' apart.		

Access Point (UAP) # 2   Bldg 695

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Wood*	Mounted To *Truss*	Grid Location *N/A*
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 6
Access Point# to HUB Office	Cable Type: *10 Base T*	Distance: 25'
Notes: Mount at top of exterior office wall on ceiling truss near external wall nearest bldg 694. Covers 100% of building interior at 11mb, exterior of building at 5.5mb up to the next building. Add 4-port Hub and patch cables to DSL modem and Office PC.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Wood*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *Truss*	Alignment *Inverse Mounted*
Ceiling Height 25 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 1 antenna mounted inside building on wood backing plate. 2nd antenna mounted outside building on treated backing plate		

Access Point (UAP) # 3   Bldg 694

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 12 Ft
Material Type *Steel*	Mounted To *I-Beam*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 6
Wireless AP to Bldg 695	Cable Type: *10 Base T*	Distance: N/A
Notes: Mount wood backing plate to support truss. Mount Access Point to front of plate to the right of main door. Covers 100% of building interior at 11mb, exterior of building at 5.5mb up to the next building.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Steel*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 12 Ft	Mounted To *I-Beam*	Alignment *Inverse Mounted*
Ceiling Height 25 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 1 antenna mounted inside building on wood backing plate. 2nd antenna mounted outside building on treated backing plate.		

Access Point (UAP) # 4   Bldg 927

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 9 Ft
Material Type *Dry Wall*	Mounted To *Truss*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 11
Access Point# to Serial 56k Modem	Cable Type: *RS232 Straight*	Distance: 20'

Notes: External RS232 modem direct-connect to AP. Another modem will be needed in building 6007. QLM will need to monitor modem traffic. Building 6007 is 1-mile away, no line-of-sight. No LAN connection in building 927.

Primary Location: Entering from Loading Dock, mount to the right, above Boards table, on ceiling. This is 40' away from 110v AC, 6' from RJ11 phone jack for modem.

Secondary Location: Entering from Loading Dock, mount to the left, above 110v receptacle. This is 6' from 110v AC, 40' from RJ11 phone jack for modem.

Covers 100% of Female clothing issue at 11mb. S4 offices were not surveyed.

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Drop Ceiling*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 9 Ft	Mounted To *Ceiling Grid*	Alignment *Inverse Mounted*
Ceiling Height 9 Ft	Mast Length na Ft	Feed Line Cable Length na Ft

Notes: 2 antennas mounted on both sides of the AP as far apart as possible.

Access Point (UAP) #5 Bldg Phase 1

Hardware Mounting Information

Location Label Designated *No*	Wall Penetration Yes	Mounting Height 15 Ft
Material Type *Steel*	Mounted To *Truss*	Grid Location N/A
AP Housing *AP Bracket*	Extended DC Power Yes	Channel: 11
Access Point# HUB	Cable Type: *CAT5*	Distance: Unknown
Notes: Added per Carol Fraser. Covers 100% of Male Phase 1 clothing issue at 11mb. The rest of the building was not surveyed.		

Antenna Mounting Information

Location *Interior*	Location Label Designated *No*	Lightning Protection *No*
Material Type *Steel*	Antenna Type *H/P Diverse (4 ft)*	
Mounting Height 15 Ft	Mounted To *Steel Girder*	Alignment *Inverse Mounted*
Ceiling Height 15 Ft	Mast Length na Ft	Feed Line Cable Length na Ft
Notes: 2 antennas mounted on both sides of the AP as far apart as possible.		

Attachment A – Equipment and Materials Required

Supplied by Customer

Unshielded Twisted Pair Category 5

	Description	Part Number	Manufacturer	Qty
	Modular Cord or Patch Cable	*By customer*	*By customer*	*3*

10BaseT

	Description	Part Number	Manufacturer	Qty
	CAT5 Ethernet Cabling	*By customer*	*By customer*	*450'*
	RJ45 Connectors	*By customer*	*By customer*	*6*

Miscellaneous Materials (Nema Etc.)

	Description	Part Number	Manufacturer	Qty
1.	4 port Ethernet hub	*By customer*	*By customer*	*3*
2	External RS232 Modems	*By Customer*	*By customer*	*2*
3.	RS232 cabling (6')	*By customer*	*By customer*	*2*
4.	RJ11 phone cabling (10', 6')	*By customer*	*By customer*	*2*
5.	Treated Plywood (16"x 12") Bldg 694 For internal Access Point mounting	*By customer*	*By customer*	*1*
6.	Treated Plywood (4"x 15") Bldg 694-5 For external antenna mounting	*By customer*	*By customer*	*2*
7.	Plywood (24"x 15") Bldg 927 For internal Access Point and Modem	*By customer*	*By customer*	*2*
8.	Steel Girder mounting brackets	*By customer*	*By customer*	*2*

Purchase from Computer Pro's ,

Spectrum24™ Antennas

	Description	Qty
	Single High Performance Access Point Antenna (3dBi) with 4 foot Plenum cable connection, and mounting hardware	*10*

DC Power

	Description	Qty
	24V Power Supply for extended DC for one Access Point	*5*
	US Power Cord for UAP Power Supply	*5*
	BIAS-T power-over-ethernet	*5*

Spectrum24™ Universal Access Point

	Description	Qty
	Spectrum24 - 2.4 GHz, 100 mW, 11mb Ethernet Access Point, without PSU or Antenna.	5

Mounting Brackets

	Description	Qty
1.	Mounting Bracket plate	*5*
2.	Drop Ceiling Mounting Bracket plate clips	*2*

Attachment B – Proposed 11mb RF Coverage

See 8 ½"x14" Color Drawings

Appendix C

HHT Requirements Specification

Requirements Control Group:	**QLM HHT2**
Function:	**Symbol Palm HHT 1846 for Receiving, Physical Inventory, Stock Movement - RF and Batch**
Application:	**QLM**
Customer:	**ARN**
Hardware Platform	**Symbol's Spectrum 24 NAP; Symbol Palm 1746/1846 HHTs**
HHT Operating System	**Palm v3.5.2**
Development Tools	**Code Warrior**
Test Site:	**Parris Island**
Date Approved:	

I. Background

Project Parameters:

Project Identification

Software Title: QLMHHT
Current Version #:   1.0
Target Version #:   2.0

Project Dates

Target Start Date: 13 September 2002
Actual Start Date: 16 September 2002
Target Readiness Date: 15 November 2002
Scheduled Deployment Date: TBD

Scope Parameters:

Project Type: New Development
Software Type: Software Component
Desired Quality: Commercial
Target Iteration Size: Medium (8 weeks)
Iteration Path: Formal

General Project Definition:

Using the Code Warrior development tools, AdvanTech will program a stock movement application, physical inventory application for the Palm 1746/1846 OS. AdvanTech will also modify the current receiving application.

Business Justification:

This project will provide a more efficient means of updating the on-hand balances of DSCP stock at Parris Island. Through automatic processing of receipts, inventory gains, inventory losses and physical inventory counts, the likelihood of inventory imbalances due to batch process synchronization is eliminated.

Project Scope Definition:

Version 2:   The HHT inventory programs will be converted and redesigned from the Novis operating system to the Palm OS operating system. The current Palm OS receiving program will be modified to allow for hotsync transmissions in addition to RF transmissions. A new stock movement program will be developed utilizing both hotsync and RF transmission techniques.

Version 2.5:   The HHT inventory, receiving and stock movement programs will incorporate modem transmission routines. An additional program to capture recruit issues via RF will be developed and incorporated.

Critical Success Factors:

Project must be completed NLT 15 December 2002.

Security of the RF network must meet the MCRD-PI guidelines. (Anticipation of an additional 60 hours of development/testing hours must not be exceeded.)

Risk Factors:

RF network security concerns must be specifically identified before requirements can be developed and systems design can begin.

End User Description:

Each handheld can be used by different users to perform any of the three functions: inventory, stock movement or receiving. Each function occurs in multiple locations that will have coverage by a Network Access Point. Any single user may perform some or all functions.

II. Functional Scenario

AdvanTech, Inc. has 3 different programs on 3 different hardware platforms that are used by customers in support of handheld technology (HHT). The receiving application runs on the Symbol 1746 Palm device and is a Radio Frequency application. A batch physical inventory application runs on the Novis handheld device (for Marine Corps Recruit Depot-San Diego) and on an older Symbol series 3800 terminals provided by DSCP for the Army Recruit Training Centers.

The manufacturer no longer supports Novis HHTs and the Symbol 3800 terminals are not wireless capable and are no longer under warranty. As a result, AdvanTech is moving away from the Novis units and has selected the Symbol 1746/1846 Palm device as the HHT device to be used with QLM/Local for the ARN project.

III. Current Functional Process Description

Receiving Function:

Receiving clerk will inspect/count the supplies and validate against the shipping documentation, using the HHT scan the bar code on the shipping documentation.

If the bar code is "readable" the system populates the QLM Receive Material window with: <Document Number> <NSN> <Quantity> <Purchase Unit> and <RIC>.
The system also populates the Description Link with the item description
The system also populates the Location Link with <Index Number> <Issue Unit> <Bin Location> <Bulk Location> <QOH> <Average Daily Usage> and <Days On Hand>

The user enters the Quantity Received, and can update the Source field. The clerk will continue to process receipts and when finished or during some user defined time frame, the clerk will press a "Done" button on the HHT, and the receipt transaction text file will be sent via the RF network to the QLM/Local server.

If the bar code is not "readable", the system will messages the user to enter the document number. The user enters the document number into the HHT, and the system populates the QLM Receive Material window with: <Purchase Unit>, <NSN>, <Quantity>, and <RIC> or the user will be required to enter all of this data if the document number is not found in the **recduehht.db**.

The user enters the Quantity Received, and can update the Source field. The clerk will continue to process receipts and when finished or during some user defined time frame, the clerk will press a "Done" button on the HHT, and the receipt transaction text file will be sent via the RF network to the QLM/Local server.

Physical Inventory Function:

Batch Physical Inventory

Users use a Symbol 'gun' HHT or a Novis HHT unit. Users logon to the HHT and proceed to scan Bin/Index location labels. Once user scans one label, the user computes all case quantities and enters the loose quantities. The user saves each record and proceeds to the next label. Once user has completed the inventory of the locations, he/she docks the handheld and sends the data to the QLM/Local server.

QLM/Local uploads the data from the c:\qlm\handheld directory and processes the inventory counts and computes the inventory variance.

IV. New Functional Process Description

The Palm will be operated in a batch mode, RF mode, or dial-up mode. User will specify the mode of transmission and file structures will accommodate the transmission method of the functions.

Receiving Batch <Phase I>

User turns on Palm.

User clicks QLM icon

The Palm displays the "Select QLM Transmission" Screen

User can select Batch
User can select RF
User can select Dial-Up <Phase II>

The user selects Batch.

The user is then prompted with the message: Dock the Handheld and login. Press OK to continue.

The user docks the handheld and enters his/her user id and password and presses the Sync Icon. (Note: Palm screen should instruct user to press the Sync Icon after entering user id and password.)

The RF server passes the **usershht.db** to the Palm.

The Palm validates the user id and password data against the **usershht.db**.

If the user id and password do not match the **usershht.db**, the Palm will display: "Logon Failed. Enter a valid user id and password." User clicks OK and tries again.

If the user id and password are validated the Palm checks to see if there are outgoing files to send

If there are receipt files to send the Palm prompts the message: "Send Receipt Data" "Yes" "No".
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Receipt Process".
If the user clicks "Yes" the "batch receipt" text file is transferred to C:\qlm\handheld and the recduehht.txt is deleted from the Palm.
If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data" "Yes" "No"
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Inventory Process".
If the user clicks "Yes" the "physical inventory" text file is transferred to C:\qlm\handheld directory. The physical inventory data is deleted from the Palm.
If there are "stock movement" files to send the Palm prompts the message: "Send Stock Movement Data" "Yes" "No" (Note: This is a Phase II process.)
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Stock Movement Process".
If the user clicks "Yes" the "stock movement" text file is transferred to C:\qlm\handheld directory. The stock movement data is deleted from the Palm.
If there are recruit issue files to send the Palm prompts the message: "Send Recruit Issue Data" "Yes" "No" (Note: This is a Phase II process.)
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Recruit Issue Process".
If the user clicks "Yes" the "recruit issue" text file is transferred to C:\qlm\handheld directory. The recruit issue data is deleted from the Palm.

After all processes have cleared, the Palm will display the "Select Process" menu

User can select "Receiving", and click "Sync" (icon)
User can select "Physical Inventory", and click "Sync" (icon)
User can select "Stock Movement", and click "Sync" (icon)
User can select "Recruit Issues", and click "Sync" (icon) <Phase II>

User selects Receiving, and clicks sync.

If an inventory is underway, user is prompted: "Physical Inventory Underway, Try Again Later".

If no inventory is underway, all current **recduehht.db** records are deleted from the Palm, all **phycnt.dat** records are deleted from the Palm, all **stkrmovhht.db** records are deleted from the Palm, and all **isshht.db** records are deleted from the Palm. The **recduehht.db** file is then downloaded to the HHT.

A message is displayed: "Downloading Recduehht" on the Palm screen.

After successful download the Palm displays the QLM Processing screen. Only the File and Receiving menu items are active.

The user takes the Palm to the receiving area.

Receiving clerk will inspect/count the supplies and validate against the shipping documentation, and using the HHT scans the bar code on the shipping documentation.

If the Bar Code is "readable:

The system populates the QLM Receive Material window with: <Document Number> <NSN> <Quantity> <Purchase Unit> and <RIC>

The system also populates the Description Link with the item description
The system also populates the Location Link with <Index Number> <Issue Unit> <Bin Location> <Bulk Location> <QOH> <Average Daily Usage> and <Days On Hand>

The user enters the Quantity Received, and can update the Source field.
The clerk will continue to process/scan receipts and can click Save after each receipt, can click Save after processing multiple receipts, or can click Done after one or more receipts are processed.
If the Save button is clicked the QLM Receive Material screen remains displayed.
If the Done button is clicked, the Palm prompts the message: "Dock the Handheld, and sync."
User clicks OK and docks the Palm.
If the Sync Icon is clicked and the handheld is not docked, the Palm prompts the message: "Dock the Handheld, and click Sync Icon". User clicks OK, docks the Palm and clicks Sync Icon.
If the handheld is docked and user clicks, the Palm will display: "Send Receipt Data" "Yes" "No".

If the user clicks "Yes" the "batch receipt" text file is transferred to C:\qlm\handheld and the **recduehht.txt** is deleted from the Palm.
The naming convention of the "batch receipt" text file is **123YYYYMMDDHHMMSS.txt** (where 123 = last 3 characters of the IP Address, YYYY = Year, MM = Month, DD = Day, HH = Hour, MM = Minutes, and SS = Seconds)
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Receipt Process".   User clicks Continue.

If the bar code is not "readable" but the document number is found in the **recduehht.db**:

The system will message the user to enter the document number. The user enters the document number into the HHT, and if the document number is found in the **recduehht.db** the system populates the QLM Receive Material window with: <Document Number> <NSN> <Quantity> <Purchase Unit> and <RIC>

The system also populates the Description Link with the item description
The system also populates the Location Link with <Index Number> <Issue Unit> <Bin Location> <Bulk Location> <QOH> <Average Daily Usage> and <Days On Hand>

Return to step 19.c.

If the bar code is not "readable" and the document number is not found in the **recduehht.db**:

The system will message the user to enter the document number. The user enters the document number into the HHT, the system prompts the user with "Document Number Not Found, Continue? Yes or No"
If user clicks Yes, system displays document number and user enters the <NSN>, <Quantity> <Purchase Unit> and <RIC> (if known).
If user clicks No, system clears the document number field and the user can begin again.
Return to step 19.c

The QLM/Local system will periodically poll the c:\qlm\handheld directory and process the valid document numbers…closing out the "open Dues-In" and populating the **viewdscprec.db (??)**, and will process records with document numbers not found as inventory adjustment gain with a reason code in the transaction register of "receipt not due-in".

Receiving RF <Phase I>

 User turns on Palm.

User clicks QLM icon

The Palm displays the "Select QLM Transmission" Screen

User can select Batch
User can select RF
User can select Dial-Up <Phase II>

The user selects RF.

The user is then prompted "Enter User ID and Password". User enters the userid and password and presses connect

The RF server passes the **usershht.db** to the Palm.

The Palm validates the user id and password data against the **usershht.db**.

If the user id and password do not match the **usershht.db**, the Palm will display: "Logon Failed. Enter a valid user id and password." User clicks OK and tries again.

If the user id and password are validated the Palm checks to see if there are outgoing files to send

If there are receipt files to send the Palm prompts the message: "Send Receipt Data" "Yes" "No".

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Receipt Process".
If the user clicks "Yes" the "batch receipt" text file is transferred to C:\qlm\handheld and the recduehht.txt is deleted from the Palm.

If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data" "Yes" "No"

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Inventory Process".
If the user clicks "Yes" the "physical inventory" text file is transferred to C:\qlm\handheld directory. The physical inventory data is deleted from the Palm.

If there are "stock movement" files to send the Palm prompts the message: "Send Stock Movement Data" "Yes" "No" (Note: This is a Phase II process.)

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Stock Movement Process".
If the user clicks "Yes" the "stock movement" text file is transferred to C:\qlm\handheld directory. The stock movement data is deleted from the Palm.

If there are recruit issue files to send the Palm prompts the message: "Send Recruit Issue Data" "Yes" "No" (Note: This is a Phase II process.)

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Recruit Issue Process".
If the user clicks "Yes" the "recruit issue" text file is transferred to C:\qlm\handheld directory. The recruit issue data is deleted from the Palm.

After all processes have cleared, the Palm will display the "Select Process" menu

User can select "Receiving", and click "Sync Icon"
User can select "Physical Inventory", and click "Sync Icon"
User can select "Stock Movement", and click "Sync Icon" <Phase II>
User can select "Recruit Issues", and click "Sync Icon" <Phase II>

User selects Receiving, and clicks Sync Icon.

If an inventory is underway, user is prompted: "Physical Inventory Underway, Try Again Later".

If no inventory is underway, all current **recduehht.db** records are deleted from the Palm, all **phinventoryhht.db** records are deleted from the Palm, all **stkrmovhht.db** records are deleted from the Palm, and all **isshht.db** records are deleted from the Palm. The **recduehht.db** file is then downloaded to the HHT.

A message is displayed: "Downloading Recduehht" on the Palm screen.

After successful download the Palm displays the QLM Processing screen. Only the File and Receiving menu items are active.

The user takes the Palm to the receiving area.

Receiving clerk will inspect/count the supplies and validate against the shipping documentation, and using the HHT scans the bar code on the shipping documentation.

If the Bar Code is "readable:

a. The system populates the QLM Receive Material window with: <Document Number> <NSN> <Quantity> <Purchase Unit> and <RIC>

i. The system also populates the Description Link with the item description

ii. The system also populates the Location Link with <Index Number> <Issue Unit> <Bin Location> <Bulk Location> <QOH> <Average Daily Usage> and <Days On Hand>

b. The user enters the Quantity Received, and can update the Source field.
c. The clerk will continue to process/scan receipts and can click Save after each receipt, can click Save after processing multiple receipts, or can click Done after one or more receipts are processed.
d. If the Save button is clicked the QLM Receive Material screen remains displayed.
e. If the Done button is clicked, the Palm returns to the main QLM processing window.
f. To send the receipt file, the user clicks the Send on the receipt screen.

g. The user is logged out of the QLM session on the Palm.

If the bar code is not "readable" but the document number is found in the **recduehht.db**:

The system will message the user to enter the document number. The user enters the document number into the HHT, and if the document number is found in the **recduehht.db** the system populates the QLM Receive Material window with: <Document Number> <NSN> <Quantity> <Purchase Unit> and <RIC>

The system also populates the Description Link with the item description
The system also populates the Location Link with <Index Number> <Issue Unit> <Bin Location> <Bulk Location> <QOH> <Average Daily Usage> and <Days On Hand>

Return to step 18.c.

If the bar code is not "readable" and the document number is not found in the **recduehht.db**:

The system will message the user to enter the document number. The user enters the document number into the HHT, the system prompts the user with "Document Number Not Found, Continue? Yes or No"

If user clicks Yes, system displays document number and user enters the <NSN>, <Quantity> <Purchase Unit> and <RIC> (if known).
If user clicks No, system clears the document number field and the user can begin again.

Return to step 18.c

QLM/Local will periodically poll the c:\qlm\handheld directory and process the valid document numbers…closing out the "open Dues-In" and populating the **viewdscprec.db (??)**, and will process records with document numbers not found as inventory adjustment gain with a reason code in the transaction register of "receipt not due-in".

Physical Inventory Batch Process Flow <Phase I>

1. In QLM/Local, user opens the Physical Inventory function.

2. User clicks "Open New Physical Inventory" button.

3. User is prompted with message: "Make sure all receipts have been processed from handheld before continuing."

4. User clicks "Standard Physical" or "Random Cycle Count" radio button

5. The "Designate Count Teams" window appears.

6. User designates the IP Address of the Palm and/or manual count team leader initials.

7. The "Start New Physical Inventory" window appears.

8. The user designates the items to inventory.

9. The "Assign Inventory to Teams" window appears.

10. The user designates the location, index, or NSN ranges to the designated count teams

11. User prints count sheets for each manual count team.

12. User turns on Palm.

13. User clicks QLM icon

14. The Palm displays the "Select QLM Transmission" Screen
User can select Batch
User can select RF
User can select Dial-Up (Phase II)

15. User selects Batch.

16. Palm system prompts user to: Dock Handheld and logon. Press OK to continue.
17. User docks Palm and enters his/her user id and password and presses sync. (Note: Palm screen should instruct user to press Sync after entering user id and password.)

18. The RF server passes the usershht.db to the Palm.

19. The Palm validates the user id and password data against the usershht.db.

20. If the user id and password are validated the palm checks to see if there are outgoing files to send
If there are receipt files to send the palm prompts the message: "Send Receipt Data, Yes No"
If the user clicks "No" the Palm prompts: "Click Continue to Return to the receipt Process."
If the user clicks "Yes" the "batch receipt" text file is transferred to c:\qlm\handheld and the recduehht.txt is deleted from the Palm.
If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data Yes No"

If the user clicks "No" the Palm prompts: :Click Continue to Return to the Inventory Process".
If the user clicks "Yes" the invcount123.txt file is transferred to c:\qlm\handhelds. The pi_count123.db is deleted from the Palm.
If there are 'stock movement" files to send the Palm prompts the message: "Send Stock Movement Data Yes No" (Note: Phase II process)
If there are recruit issue files to send the Palm prompts the message: Send Recruit Issue Data Yes No" (Note: Phase II process.)

21. After all processes have cleared, the Palm will display the "Select Process" menu

a. Receiving, click Sync
b. Physical Inventory, click Sync
c. Stock Movement, click Sync
d. Recruit Issues, click Sync

22. User selects Physical Inventory, and clicks Sync.

23. The Palm downloads from c:\qlm\programs the pi_count123.dat where 123 is the corresponding last 3 characters of the Palm IP address.

24. The pi_count123.dat will be sorted in bin location sequence.

25. Only the File and Inventory menu items will be active on the Palm device.

26. On the Palm, the user clicks on Inventory.

27. The first location is displayed on the Palm screen.
a. User can scan or enter the first NSN in the location.
The Item Description is displayed
User clicks "Cases" button and the Cases Screen is displayed.
User can enter case size 1 value, case size 1 qty, case size 2 value, case size 2 qty, case size 3 value, case size 3 qty, case size 4 value, case size 4 qty.
User presses Done button on Cases Screen
Palm calculates the total case lowest unit of measure.
b. The system populates the Case Qty field with the calculated lowest unit of measure from above.
c. User counts all loose quantities not associated to a case and enters the data in the Loose Qty field.
d. Palm system totals the Case Qty and Loose Qty for the Total Count field.
e. User can click Next NSN button to save current data and enter data for another NSN in the same location.
f. User can click Next Loc button to save current data and move to the next location and begin scanning/entering NSN.

g. User can click Add Loc to add a location not found in the Physical Inventory location listed.
h. User can click < (previous) or > (next) to scroll through the records and view or edited inventory records.
i. User can click Done to return to the Palm main QLM processing window

28. The user can send the inventory data by selecting Sync from the main Physical Inventory menu.

29. Palm displays prompt to dock the Handheld and press send. (Palm provides warning that all locations should be inventoried before pressing sync.)

30. After pressing sync, system transfers the invcount123.txt to c:\qlm\handheld, deletes the pi_count123.dat file, and logs user off.

31. QLM/Local polls c:\qlm\handheld and picks up the pi_count123.dat files.

Physical Inventory RF <Phase I>

1. User opens Physical Inventory program in QLM/Local.

2. User clicks "Open New Physical Inventory" button.

3. User is prompted with message: "Make sure all receipts have been processed from handheld before continuing."

4. User clicks "Standard Physical" or "Random Cycle Count" radio button

5. The "Designate Count Teams" window appears.

6. User designates the IP Address of the Palm and/or manual count team leader initials.

7. The "Start New Physical Inventory" window appears.

8. The user designates the items to inventory.

a. The "Assign Inventory to Teams" window appears.
b. The user designates the location, index, or NSN ranges to the designated count teams
c. User prints count sheets for each manual count team.

9. User turns on Palm.

10. User clicks QLM icon

11. The Palm displays the "Select QLM Transmission" Screen

User can select Batch
User can select RF
User can select Dial-Up (Phase II)

12. User selects RF.

13. Palm system prompts user to: Logon. Press Connect to continue.

14. User enters his/her user id and password and presses connect

15. The RF server passes the usershht.db to the Palm.

16. The Palm validates the user id and password data against the usershht.db.

17. If the user id and password are validated the palm checks to see if there are outgoing files to send
a. If there are receipt files to send the palm prompts the message: "Send Receipt Data, Yes No"
If the user clicks "No" the Palm prompts: "Click Continue to Return to the receipt Process."
If the user clicks "Yes" the "batch receipt" text file is transferred to c:\qlm\handheld and the recduehht.txt is deleted from the Palm.

b. If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data Yes No"

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Inventory Process".
If the user clicks "Yes" the invcount123.txt file is transferred to c:\qlm\handhelds. The pi_count123.db is deleted from the Palm.

c. If there are 'stock movement" files to send the Palm prompts the message: "Send Stock Movement Data Yes No" (Note: Phase II process)

d. If there are recruit issue files to send the Palm prompts the message: Send Recruit Issue Data Yes No" (Note: Phase II process.)

18. After all processes have cleared, the Palm will display the "Select Process" menu

a. Receiving
b. Physical Inventory

c. Stock Movement
Recruit Issues

19. User selects Physical Inventory

20. The Palm downloads from c:\qlm\programs the pi_count123.dat where 123 is the corresponding last 3 characters of the Palm IP address.

21. The pi_count123.dat will be sorted in bin location sequence.

22. Only the File and Inventory menu items will be active on the Palm device.

23. On the Palm, the user clicks on Inventory.

24. The first location is displayed on the Palm screen.

a. User can scan or enter the first NSN in the location.
The Item Description is displayed
User clicks "Cases" button and the Cases Screen is displayed.
User can enter case size 1 value, case size 1 qty, case size 2 value, case size 2 qty, case size 3 value, case size 3 qty, case size 4 value, case size 4 qty.
User presses Done button on Cases Screen
Palm calculates the total case lowest unit of measure.

b. The system populates the Case Qty field with the calculated lowest unit of measure from above.

c. User counts all loose quantities not associated to a case and enters the data in the Loose Qty field.

d. Palm system totals the Case Qty and Loose Qty for the Total Count field.

e. User can click Next NSN button to save current data and enter data for another NSN in the same location.

f. User can click Next Loc button to save current data and move to the next location and begin scanning/entering NSN.

g. User can click Add Loc to add a location not found in the Physical Inventory location listed.

h. User can click < (previous) or > (next) to scroll through the records and view or edited inventory records.

i. User can click Done to return to the Palm main QLM processing window

25. The user can send the inventory data by selecting Send from the main Physical Inventory menu.

26. Palm provides warning that all locations should be inventoried before pressing send.

27. After pressing send, system transfers the invcount123.txt to c:\qlm\handheld, deletes the pi_count123.dat file, and logs user off.

28. QLM/Local polls c:\qlm\handheld and picks up the pi_count123.dat files.

Stock Movement Batch <Phase I>

User turns on Palm.

User clicks QLM icon

The Palm displays the "Select QLM Transmission" Screen

User can select Batch
User can select RF
User can select Dial-Up <Phase II>

The user selects Batch.

The user is then prompted with the message: Login and Dock the Handheld. Press OK to continue.

The user enters his/her user id and password, docks the handheld, and presses the Sync Icon. (Note: Palm screen should instruct user to press the Sync Icon after entering user id and password.)

The usershht.db is passed to the Palm handheld

The Palm validates the user id and password data against the **usershht.db**.

If the user id and password do not match the **usershht.db**, the Palm will display: "Logon Failed. Enter a valid user id and password." User clicks OK and tries again.

If the user id and password are validated the Palm checks to see if there are outgoing files to send

If there are receipt files to send the Palm prompts the message: "Send Receipt Data" "Yes" "No".
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Receipt Process".

If the user clicks "Yes" the "batch receipt" text file is transferred to C:\qlm\handheld and the recduehht.txt is deleted from the Palm.

If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data" "Yes" "No"

 If the user clicks "No" the Palm prompts: "Click Continue to Return to the Inventory Process".

If the user clicks "Yes" the "physical inventory" text file is transferred to C:\qlm\handheld directory. The physical inventory data is deleted from the Palm.

If there are "stock movement" files to send the Palm prompts the message: "Send Stock Movement Data" "Yes" "No" (Note: This is a Phase II process.)

If the user clicks "No" the Palm prompts: "Click Continue to Return to the Stock Movement Process".

If the user clicks "Yes" the "stock movement" text file is transferred to C:\qlm\handheld directory. The stock movement data is deleted from the Palm.

If there are recruit issue files to send the Palm prompts the message: "Send Recruit Issue Data" "Yes" "No" (Note: This is a Phase II process.)

 If the user clicks "No" the Palm prompts: "Click Continue to Return to the Recruit Issue Process".

If the user clicks "Yes" the "recruit issue" text file is transferred to C:\qlm\handheld directory. The recruit issue data is deleted from the Palm.

After all processes have cleared, the Palm will display the "Select Process" menu

User can select "Receiving", and click "Sync" (icon)

User can select "Physical Inventory", and click "Sync" (icon)

User can select "Stock Movement", and click "Sync" (icon)

User can select "Recruit Issues", and click "Sync" (icon) <Phase II>

User selects Stock Movement, and clicks sync.

If an inventory is underway, user is prompted: "Physical Inventory Underway, Try Again Later".

If no inventory is underway, the Stock Movement Tracking Screen is displayed with buttons to Send, Accept, View or Return.

User taps Send, the Stock Movement Tracking – Send screen is displayed.

User either scans a NSN barcode or manually enters the NSN.

User enters the quantity and UI that is to be sent to another location.

User either scans a location barcode (From Location) or manually enters the "from location.

User enters the "To" location.

A Tracking number is defaulted for each record.

The user writes this number on a label and attaches to the appropriate NSN/box.

User can Save the record and begin another, user can tap Done which saves the record and returns the user to the Main Stock Movement Tracking screen, user can tap Reset to clear the screen and begin again, or user can tap Send which sends the **stock movement text** file to the C:\Palm\Handheld folder.
User taps Accept, the Stock Movement Tracking – Accept screen is displayed.
User types in the tracking number of the stock movement and save/send, or
User can type the Tracking number, quantity and UI and save/send, or
User can type the Tracking number, quantity and UI, final location and save/send, or
User can type the Tracking number, NSN, quantity and UI, final location, and save/send.
User taps View to review all stock movement actions that have been processed on the handheld but which have not been sent.
If user taps send on any screen, the handheld will prompt the user to dock the handheld and press the hotsync button.
User taps Return to return to the main QLM Processing screen.

The QLM/Local system will periodically poll the c:\qlm\handheld directory and process the stock movement transactions. A Stock Movement Tracking report will be updated with each file processed.

Stock Movement RF <Phase I>

User turns on Palm.

User clicks QLM icon

The Palm displays the "Select QLM Transmission" Screen

User can select Batch
User can select RF
User can select Dial-Up <Phase II>

The user selects Batch.

The user is then prompted with the message: Login and Dock the Handheld. Press OK to continue.

The user enters his/her user id and password, docks the handheld, and presses the Sync Icon. (Note: Palm screen should instruct user to press the Sync Icon after entering user id and password.)

*The **usershht.db** is passed to the Palm handheld*

The Palm validates the user id and password data against the **usershht.db**.

If the user id and password do not match the **usershht.db**, the Palm will display: "Logon Failed. Enter a valid user id and password." User clicks OK and tries again.

If the user id and password are validated the Palm checks to see if there are outgoing files to send

If there are receipt files to send the Palm prompts the message: "Send Receipt Data" "Yes" "No".
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Receipt Process".
If the user clicks "Yes" the "batch receipt" text file is transferred to C:\qlm\handheld and the recduehht.txt is deleted from the Palm.
If there are inventory files to send the Palm prompts the message: "Send Physical Inventory Data" "Yes" "No"
 If the user clicks "No" the Palm prompts: "Click Continue to Return to the Inventory Process".
If the user clicks "Yes" the "physical inventory" text file is transferred to C:\qlm\handheld directory. The physical inventory data is deleted from the Palm.
If there are "stock movement" files to send the Palm prompts the message: "Send Stock Movement Data" "Yes" "No" (Note: This is a Phase II process.)
If the user clicks "No" the Palm prompts: "Click Continue to Return to the Stock Movement Process".
If the user clicks "Yes" the "stock movement" text file is transferred to C:\qlm\handheld directory. The stock movement data is deleted from the Palm.
If there are recruit issue files to send the Palm prompts the message: "Send Recruit Issue Data" "Yes" "No" (Note: This is a Phase II process.)
 If the user clicks "No" the Palm prompts: "Click Continue to Return to the Recruit Issue Process".
If the user clicks "Yes" the "recruit issue" text file is transferred to C:\qlm\handheld directory. The recruit issue data is deleted from the Palm.

After all processes have cleared, the Palm will display the "Select Process" menu
User can select "Receiving", and click "Sync" (icon)
User can select "Physical Inventory", and click "Sync" (icon)
User can select "Stock Movement", and click "Sync" (icon)
User can select "Recruit Issues", and click "Sync" (icon) <Phase II>

User selects Stock Movement, and clicks sync.

If an inventory is underway, user is prompted: "Physical Inventory Underway, Try Again Later".

If no inventory is underway, the Stock Movement Tracking Screen is displayed with buttons to Send, Accept, View or Return.

User taps Send, the Stock Movement Tracking – Send screen is displayed.
User either scans a NSN barcode or manually enters the NSN.

User enters the quantity and UI that is to be sent to another location.
User either scans a location barcode (From Location) or manually enters the "from location.
User enters the "To" location.
A Tracking number is defaulted for each record.
The user writes this number on a label and attaches to the appropriate NSN/box.
User can Save the record and begin another, user can tap Done which saves the record and returns the user to the Main Stock Movement Tracking screen, user can tap Reset to clear the screen and begin again, or user can tap Send which sends the **stock movement text** file to the C:\Palm\Handheld folder.
User taps Accept, the Stock Movement Tracking – Accept screen is displayed.
User types in the tracking number of the stock movement and save/send, or
User can type the Tracking number, quantity and UI and save/send, or
User can type the Tracking number, quantity and UI, final location and save/send, or
User can type the Tracking number, NSN, quantity and UI, final location, and save/send.
User taps View to review all stock movement actions that have been processed on the handheld but which have not been sent.
If user taps send on any screen, the handheld will send via the RF server the Stock Movement Send and Accept files to c:\QLM\Handheld.
User taps Return to return to the main QLM Processing screen.

The QLM/Local system will periodically poll the c:\qlm\handheld directory and process the stock movement transactions. A Stock Movement Tracking report will be updated with each file processed.

Recruit Issues Batch <Phase II>

TBD

Recruit Issues RF <Phase II>

TBD

V. Tables and Fields

Invcount123.txt   (Text file created by Palm with below listed fields)

invcount123.db (123 = last 3 characters of the IP Address) (Stockroom Alias) (formerly pi_import.db?) (NEW TABLE)

Stock #: (16 alphanumeric character field; Government standard identifier for items of supply; 1234-56-789-0123.) {User must enter or scan Stock # or the Bin/Index #}

Bin/Index #: (20 alphanumeric field) {User must enter or scan Stock # or the Bin/Index #}

Date Counted: (Date field)

Time Counted: (12 alphanumeric character field)

Case Size 1: (Integer that designates the number of "eaches" in a case)

Full Cases Size 1: (Integer, count of the number of full cases of the applicable case size)

Case Size 2: (Integer that designates the number of "eaches" in a case)

Full Cases Size 2: (Integer, count of the number of full cases of the applicable case size)

Case Size 3: (Integer that designates the number of "eaches" in a case)

Full Cases Size 3: (Integer, count of the number of full cases of the applicable case size)

Loose Units: (Integer, count of the number of items that are less than a full case or which are strewn about)

QOH: (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; displays the total quantity of the item on hand.)

Bin Loc.: (8 alphanumeric character field; displays a recommended bin location.)

User ID: (10 alphanumeric character field)

HHT IP: (Integer, last 3 characters of the HHT IP address. Specific locations are designated/assigned to specific HHTs)

pi_count123.dat (Stockroom Alias) (NEW TABLE Sorted in bin location sequence)

Stock #: (16 alphanumeric character field; Government standard identifier for items of supply; 1234-56-789-0123.) {User must enter or scan Stock # or the Bin/Index #}

Description: (40 alphanumeric character field; displays the product name.)

Bin/Index #: (20 alphanumeric field) {User must enter or scan Stock # or the Bin/Index #}

Loc.: (8 alphanumeric character field; displays the location(s) corresponding to the location range for the HHT/count team.)

ID: (Integer, last 3 characters of the HHT IP address or count team designation. Specific locations are designated/assigned to specific HHTs or count teams.)

Stock #: (16 alphanumeric character field; Government standard identifier for items of supply; 1234-56-789-0123.) {User can scan or enter and index number or the Stock #}

Index Number: (6 alphanumeric character field) {User can scan or enter and index number or the Stock #}

pi_teamid.db (NEW TABLE)

IP Address: (10 numeric character identifier of each Palm device) {IP Address and/or Initials are used}

ID: (last 3 characters of the IP address, this is extrapolated from the IP Address)

Initials: (3 alphanumeric characters of the manual count team leader) {IP Address and/or Initials are used}

recduehht.db (Master alias)

Document Number: (Primary Index; 8 or 9 alphanumeric characters; first 4 characters = Julian Date, last 4-5 characters = alphanumeric serial number)

Index #: (5 alphanumeric character field; system generated unique identifier for each Master Catalog record.)

Stock #: (16 alphanumeric character field; Government standard identifier for items of supply; 1234-56-789-0123.)

Qty Ordered (UP): (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; records the quantity of the item ordered based on the unit of purchase measurement.)

SAMMS RIC: (3 alphanumeric character field; displays the source of supply for the order.)

Description: (40 alphanumeric character field; displays the product name.)

Issue Unit: (3 alphanumeric character field; displays the unit of measure UOM)

Purchase Unit: (3 alphanumeric character field; displays the Unit of Purchase measurement.)

Bin Loc.: (8 alphanumeric character field; displays a recommended bin location.)

Bulk Loc.: (8 alphanumeric character field; displays a recommended bin location.)

QOH: (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; displays the total quantity of the item on hand.)

Average Daily Usage: (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; displays the calculated average daily usage of the item.)

usershht.db (Master alias)

User Name: (10 alphanumeric character field; primary key)

Password: (10 alphanumeric character field; primary key)

First Name: (10 alphanumeric character field)

Last Name: (10 alphanumeric character field)

User Type: (2 alphanumeric character field; designates the types of functions that a user can perform.)

Stockroom: (6 alphanumeric character field; designates the stockroom for which a user can perform functions.)

"Batch Receipt" Text File

123YYYYMMDDHHMMSS.txt (where 123 = last 3 characters of the IP Address, YYYY = Year, MM = Month, DD = Day, HH = Hour, MM = Minutes, and SS = Seconds

Source: SAMMS RIC (3 alphanumeric character field; displays the source of supply for the order.)

"Stock Movement" Text File

043YDDD0001sSTM.txt (where 043 = last 3 characters of the IP Address, YDDD = Julian Date (Year and date 1-365), 0001 = sequence # maintained on the handheld and assigned for the "send" portion of the stock movement transaction, "s" = designator for a stock movement send transaction or "a" = designator for a stock movement accept transaction, STM = stock movement send designator)

Data on the Send STM text file:

Item Number (16 alphanumeric character field; Government standard identifier for items of supply; 1234-56-789-0123.) {User can scan or enter and index number or the Stock #}
Quantity: (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; records the quantity of the item moved.)
Issue Unit: (3 alphanumeric character field; displays the unit of measure UOM)
From Location (8 alphanumeric character field)
To Location (8 alphanumeric character field)
Sender User Name: (10 alphanumeric character field)
Date: (Date Field)
Time sent: (hh:mm:ss)
Transaction Number: (043YDDD0001s)

Data on the Accept STM text file:

Transaction Number (043YDDD0001a)
Item Number (Optional)
Quantity: (number field; the range of values possible for a number field is from -10e307 to 10e308 with 15 significant digits; records the quantity of the item moved.)
Issue Unit: (3 alphanumeric character field; displays the unit of measure UOM)
To Location (8 alphanumeric character field)
Date: (Date Field)
Time: (hh:mm:ss)
Accepter User Name: (10 alphanumeric character field)

VI. Buttons

Name	System	Screen	Function
Done	Palm	Cases	Indicates all cases have been counted and should return to the Loc/NSN inventory record.
Next NSN	Palm	Physical Inventory	Saves current

Name	System	Screen	Function
			location, NSN and qty data; defaults same location clears NSN and qty for new input.
Next Loc	Palm	Physical Inventory	Saves current location NSN and qty data, prompts next sequential location and clears NSN and qty data for new input.
Cases	Palm	Physical Inventory	Links to secondary screen for user input relative numbers of cases and case sizes.
Reset	Palm	Physical Inventory	Clears the screen
Add Loc	Palm	Physical Inventory	Allows the user to enter a new location and scan/enter NSN and qty data.
Previous <	Palm	Physical Inventory	Allows user to scroll to previous record and view or update data.
Next >	Palm	Physical Inventory	Allows user to scroll to next record and view/update data or enter new data.
Done	Palm	Physical Inventory	Saves current data and returns user to the main processing window. User can return by selecting the Physical Inventory menu item. User will return to last location and NSN record.

Name	System	Screen	Function
OK	Palm	Physical Inventory	If user has selected the Next NSN button but no additional NSNs exist for the location record, system returns the user to the next inventory location and 1st NSN record displayed for the location.
New	Palm	Physical Inventory	If user has selected the Next NSN button but no additional NSNs exist for the location record, system allows user to scan new NSN barcode or enter new NSN and record inventory counts.
Description	Palm	Receipt Processing	Displays the Description pop-up screen.
OK	Palm	Receiving, Description	Closes the Description screen.
Location/Qty	Palm	Receipt Processing	Opens the Location/Qty screen and returns user to Receipt Process screen.
OK	Palm	Receiving, Location/Qty	Closes the Location/Qty screen and returns user to Receipt Process screen.
Due-In	Palm	Receipt Processing	Opens the Due-In screen.

Name	System	Screen	Function
OK	Palm	Receiving, Due-In	Closes the Due-In screen and returns user to Receipt Process screen.
Save	Palm	Receipt Processing	Saves current data and resets screen for next receipt
Done	Palm	Receipt Processing	Saves current data and returns user to the main processing window.
Reset	Palm	Receipt Processing	Clears current data without saving.
Send	Palm	Receipt Processing	Sends the current data to the QLM/Local server.
Send	Palm	Stock Movement Tracking	Opens the Stock Movement Tracking – Send screen
Accept	Palm	Stock Movement Tracking	Opens the Stock Movement Tracking – Accept screen
Return	Palm	Stock Movement Tracking	Returns to Main QLM Palm screen
View	Palm	Stock Movement Tracking	Opens the Stock Movement Tracking Accept or Send Screen based on the Type of Transactions available to view ("a" or "s")
Save	Palm	Stock Movement Tracking - Send	Saves current data and resets screen for next record
Done	Palm	Stock Movement Tracking - Send	Saves current data and returns user to the Stock Movement Tracking Screen.

Name	System	Screen	Function
Reset	Palm	Stock Movement Tracking - Send	Clears current data without saving.
Send	Palm	Stock Movement Tracking - Send	Sends the current data to the QLM/Local server.
Save	Palm	Stock Movement Tracking - Accept	Saves current data and resets screen for next record
Done	Palm	Stock Movement Tracking - Accept	Saves current data and returns user to the Stock Movement Tracking Screen.
Reset	Palm	Stock Movement Tracking - Accept	Clears current data without saving.
Send	Palm	Stock Movement Tracking - Accept	Sends the current data to the QLM/Local server.
Edit	Palm	Stock Movement Tracking-View (Send)	Allows user to modify NSN, UI, Qty and To Location fields.
Save	Palm	Stock Movement Tracking-View (Send)	Allows user to save changes.
Done	Palm	Stock Movement Tracking-View (Send)	Saves current data and returns user to the Stock Movement Tracking Screen.
Reset	Palm	Stock Movement Tracking-View (Send)	Clears modifications made without saving and resets data back to original.
Send	Palm	Stock Movement Tracking-View (Send)	Sends the current data to the QLM/Local server.
Edit	Palm	Stock Movement Tracking-View	Allows user to modify NSN, UI,

Name	System	Screen	Function
		(Accept)	Qty and To Location fields.
Save	Palm	Stock Movement Tracking-View (Accept)	Allows user to save changes.
Done	Palm	Stock Movement Tracking-View (Accept)	Saves current data and returns user to the Stock Movement Tracking Screen.
Reset	Palm	Stock Movement Tracking-View (Accept)	Clears modifications made without saving and resets data back to original.
Send	Palm	Stock Movement Tracking-View (Accept)	Sends the current data to the QLM/Local server.

VII. Processing Diagram

Diagram 1A

QLM/L

1. QLM/L clerk logs

2. QLM/L clerk logs on and system

erver

usershht

recduehht

Receipt text files

3. Usershht.db is downloaded to handheld during 'sync" and is used to validate login id and password.

Palm

4. recduehht.db is a list of all open dues-in. This file is downloaded to handheld during "sync" and is used to validate document numbers during the receiving process.

5. Receipt files are created by each handheld during the batch receiving mode. When clerk has completed processing receipts, the HHT is docked and the receipt data is transmitted to the c:\qlm\handheld

Diagram 2A Batch Receiving

Diagram 2B RF Receiving

QLM/L

7. QLM/L Polls c:\qlm\handheld for "invcont12

2. Inventory files are prepared for each HHT.

In physical inventory program, designate # of HHTs, and HHT IP address.

1. QLM/L . . .

QLM/L evenly divides the number of location records to inventory for the available HHTs.

QLM/L writes the phycnt123.dat file to c:\qlm\programs.

3. Usershht.db is downloaded to handheld after login and is used to validate login id and password.

Pi_count123.db

usershht

Invcount123.txt

6. Inventory Count text files are created by each handheld during the Batch Inventory mode. When clerk has completed the location inventory count, the clerk docks the Palm and presses "sync". The inventory count data and IP identifier is uploaded to the c:\qlm\\handheld directory.

Palm

4. pi_count123.db is hht specific location range file. File is in the c:\qlm\programs. After login, file is downloaded during "sync" with the correct file for the Palm ip address. "

Clerk performs inventory

5. Clerk inventories locations, NSN and qty. Clerk manually enters any NSN and qty and location not displayed on Palm.

Diagram 3A Batch Physical Inventory

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QLM/L

2. Inventory files are prepared for each HHT.

In physical inventory program, designate # of HHTs, and HHT IP address.

QLM/L evenly divides the number of location records to inventory for the available HHTs.

QLM/L writes the phycnt123.dat file to c:\qlm\programs.

1. QLM/L . . .

7. QLM/L Polls c:\qlm\handheld for "invcont12

3. Usershht.db is downloaded to handheld after login and is used to validate login id and password.

Pi_count123.db

usershht

Invcount123.txt

4. pi_count123.db is an equal division of bin locations. File is in the c:\qlm\programs. After login, file is transmitted via RF to the correct file for the Palm ip address. "

Palm

6. Inventory Count text files are created by each handheld during the RF Inventory mode. When clerk has completed the location inventory count, the clerk presses "Done". The inventory count data and IP identifier is transmitted to the c:\qlm\\handheld directory.

Clerk performs inventory

5. Clerk inventories locations, NSN and qty. Clerk manually enters any NSN and qty and location not displayed on Palm.

Diagram 3B RF Physical Inventory

2. QLM/L
clerk logs
on and
system

1. QLM/L
clerk logs

QLM/L

erver

usershht

Stock Movement Text
Files

3. Usershht.db is
downloaded to
handheld during
'sync" and is used to
validate login id and
password.

4. Stock movement files are
created by each handheld.
When clerk has completed
processing stock movements,
the HHT is docked and the
stock movement data is
transmitted to the
c:\qlm\handheld directory.

Palm

Diagram 4A Batch Stock Movement

QLM/L

Palm

1. QLM/L clerk logs

2. QLM/L clerk logs on and system

erver

usershht

Receipt text files

3. Usershht.db is downloaded to handheld after login and is used to validate login id and password.

4. Stock movement files are created by each handheld. When clerk has completed processing stock movements, the stock movement data is transmitted via RF to the c:\qlm\handheld directory. directory.

VIII. System Specifications QLM HHT

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	1	Setup/Op		1.7.A.01	The Palm device shall timeout and turn-off after 5 minutes of inactivity.
QLM HHT	1	Setup/Op		1.7.A.02	The Palm device will require a login id and password in order to access the QLM programs.
QLM HHT	1	Setup/Op		1.7.A.03	If the userid and login do not match, the system shall display a message, "Logon failed."
QLM HHT	1	Setup/Op		1.7.A.04	The system shall pass the userid and password to the QLM server for comparison/validation.
QLM HHT	1	Setup/Op		1.7.A.05	The system shall allow the user to establish the QLM Server IP Address and common com port.
QLM HHT	1	Setup/Op		1.7.A.06	The system shall download the recduehht.txt file from C:\QLM\Handheld upon successful login to the QLM application.
QLM HHT	2	Setup/Op		2.7.A.07	The system shall only allow one type of processing to occur on a single Palm device in the same session. No partial processing is allowed.
QLM HHT	2	Setup/Op		2.7.A.08	The system shall not allow receipt records, stock movement records and inventory records to be captured on the same handheld during the same session.
QLM HHT	2	Setup/Op		2.7.A.09	The Palm application shall allow a user to exit the Palm and allow a new user to login and continue processing applicable records in the functional process. Each record processed will be identified to the user id of the session. (User A inventories 10

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
					locations and answers the phone, User B logs in to the same Palm and inventories 20 locations. The first 10 records are identified to user A and the last 20 records are identified to user B.)
QLM HHT	2	Setup/Op		2.7.A.10	The Palm device will require a login id and password when the device is turned on.
QLM HHT	2	Setup/Op		2.7.A.11	The Palm device shall require the user to log back in after the unit has timed out and turned off.
QLM HHT	2	Setup/Op		2.7.A.12	The Palm device shall maintain the QLM application session during timeout and logon.
QLM HHT	2	Setup/Op		2.7.A.13	The Palm device shall encrypt the device password.
QLM HHT	2	Setup/Op		2.7.A.14	The Palm device shall encrypt the application password.
QLM HHT	2	Setup/Op		2.7.A.15	The Palm system shall encrypt all data transmitted to the QLM Server.
QLM HHT	1	Receiving		1.7.B.01	The manual input of a Stock # on the HHT shall allow the user to input the numbers without the dashes "-"
QLM HHT	1	Receiving		1.7.B.02	If the user is in Batch or RF Receiving mode the following menu items are the only items active for the current session: <File> <Receiving>
QLM HHT	1	Receiving	9/9/2002	1.7.B.03	~~The system shall provide the following menu items under Receiving: Process Receipts, Manual Receipts, View Receipts~~
QLM HHT	1	Receiving		1.7.B.04	The Palm system shall allow the user to scan a 1-14 or 1-15 character document number and read characters 7-14(15).
QLM HHT	1	Receiving		1.7.B.05	If a document number is not found on the recduehht file, the system

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
					shall display a "Missing/Bad Document #" screen requesting "Please enter a valid Document #"
QLM HHT	1	Receiving		1.7.B.06	If a document number is entered into the "Missing/Bad Document #" screen, the system shall only require the JD and Serial Number and suffix code if available.
QLM HHT	1	Receiving		1.7.B.07	After entering a valid document number in the "Missing/Bad Document #" screen the system shall populate the NSN, Source (if available) and Purchase Units on the QLM Receipt Processing screen.
QLM HHT	1	Receiving		1.7.B.08	After scanning a valid document number in the "Missing/Bad Document #" screen the system shall populate the NSN, Source (if available) and Purchase Units on the QLM Receipt Processing screen.
QLM HHT	1	Receiving		1.7.B.09	The Palm system shall allow the user to enter the quantity of the items that are received.
QLM HHT	1	Receiving		1.7.B.10	The Palm system shall allow the user to view the Description by tapping the Description button.
QLM HHT	1	Receiving		1.7.B.11	The Palm system shall allow the user to view the location and on-hand data by tapping the Location/Quantity button.
QLM HHT	1	Receiving		1.7.B.12	The Palm system shall display the Index #, Bin Location, Bulk Location, Qty on hand, Issue Unit of Measure, Avg Daily Usage and Days on Hand on the Location/Quantity screen.
QLM HHT	1	Receiving		1.7.B.13	All fields on the Location/Quantity screen shall be read only.
QLM	1	Receiving		1.7.B.14	The Description field on the

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
HHT					Description screen shall be read only
QLM HHT	1	Receiving		1.7.B.15	The System shall allow the user to annotate a suffix code to a valid document number.
QLM HHT	1	Receiving		1.7.B.16	The System shall compare the 9 character document number (with suffix code) to the 8 character document number in the recduehht and populate the NSN, Source and Purchase Units based on a match of characters 7-14.
QLM HHT	1	Receiving		1.7.B.17	The system shall display a message, "QLM Error", "Please enter a value for Qty Received" if the user taps Done after having scanned/entered a valid document number but has not entered a quantity received.
QLM HHT	1	Receiving		1.7.B.18	The system shall display a message, "QLM Error", "Please enter a value for Qty Received" if the user taps Send after having scanned/entered a valid document number but has not entered a quantity received.
QLM HHT	1	Receiving		1.7.B.19	The system shall display a message, "QLM Error", "Please enter a value for Qty Received" if the user taps Save after having scanned/entered a valid document number but has not entered a quantity received.
QLM HHT	1	Receiving		1.7.B.20	During Manual Receipts the system shall allow the user to manually type in a 8 character document number and populate the NSN field and source for valid document numbers.
QLM HHT	1	Receiving		1.7.B.21	During Manual Receipts the system shall allow the user to manually type in a 9 character document number and populate the NSN field and source for valid document numbers

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
					where the first 8 characters match characters 7-14 of the document number found on the recduehht file.
QLM HHT	1	Receiving		1.7.B.22	The system shall allow the user to view all receipt data prior to the data transmission to the QLM server.
QLM HHT	1	Receiving		1.7.B.23	The system shall display in the View Receipts screen, a. Doc #, b. Stock #, and c. QTY
QLM HHT	1	Receiving		1.7.B.24	The system shall accept the document number field as a case insensitive field.
QLM HHT	2	Receiving		2.7.B.25	The system shall provide the following menu items under Receiving: Process Receipts, View Receipts, Sync (Batch)
QLM HHT	2	Receiving		2.7.B.26	The system shall allow 1 Palm to transmit via RF while allowing another Palm to transmit via sync or dial-up simultaneously.
QLM HHT	2	Receiving		2.7.B.27	The system shall allow 1 Palm to process Receiving functions and transmit data in either RF, or sync mode and simultaneously the system shall allow another Palm to process Stock Movement or Recruit Issue functions and transmit Stock Movement or Recruit Issue data via RF or sync mode. The only limiting factor shall be the number of Palm devices available.
QLM HHT	2	Receiving		2.7.B.28	During the receiving process, the system shall display the Due-In screen when the user taps the Due-In button on the Receipt Process screen.
QLM HHT	2	Receiving		2.7.B.29	During the receiving process, the system shall display the "Original Document Number", the "Original

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
					Due-In Quantity", the "Remaining Quantity", and the "Last Suffix Code Used" on the Due-In screen.
QLM HHT	2	Receiving		2.7.B.30	For Receiving, the Palm system shall allow the user to edit the View receipts screen and modify the quantity and save the record.
QLM HHT	2	Receiving		2.7.B.31	For Receiving, the Palm system shall allow the user to Send files from the View receipts screen.
QLM HHT	2	Receiving		2.7.B.32	The Palm (Process Receipts) system shall recognize a document number that is 8 characters, 9 characters, 14 characters or 15 characters in length. Allow the user to scan a document number and read characters 7-14 or 7-15
QLM HHT	2	Receiving		2.7.B.33	The Palm shall display the remaining qty due-in in the Qty field on the Process Receipts screen.
QLM HHT	2	Receiving		2.7.B.34	The Palm system shall allow the user to modify the Qty field on the receiving screen.
QLM HHT	2	Receiving		2.7.B.35	The Palm system shall allow the user to enter a suffix code for a document number displayed on the Process receipts screen.
QLM HHT	2	Receiving		2.7.B.36	The Palm system shall allow a user to modify a suffix code displayed in a document number on the Process Receipts screen.
QLM HHT	2	Physical Inventory		2.7.C.01	The Palm will download the phycnt123.dat file that corresponds to the last 3 characters of the IP address of that Palm by syncing for batch mode or automatically for RF mode.
QLM HHT	2	Physical Inventory		2.7.C.02	If the user is in Batch or RF Inventory mode the following menu

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
					items are the only items active for the current session: <File> <Inventory>
QLM HHT	2	Physical Inventory		2.7.C.03	The system shall provide the following menu items under Inventory: Physical Inventory, View Inventory, Sync (Batch), Send (RF)
QLM HHT	2	Physical Inventory		2.7.C.04	The system shall display the first location on the pi_count123.dat file.
QLM HHT	2	Physical Inventory		2.7.C.05	The system shall allow the user to scan a bar code (or enter) to populate the NSN field.
QLM HHT	2	Physical Inventory		2.7.C.06	The system shall populate the item description in the Description field.
QLM HHT	2	Physical Inventory		2.7.C.07	The Palm shall allow a user to click a Cases button from the Physical Inventory screen
QLM HHT	2	Physical Inventory		2.7.C.08	The system shall link the Cases button to a Cases screen. The Cases screen shall provide the means of capturing multiple case sizes during an inventory for a single location and NSN. (User will be prompted to enter loose qty, then case size "1", # of full cases - case size "1", case size, # of full cases, etc. until user clicks "Done" button.)
QLM HHT	2	Physical Inventory		2.7.C.09	The system shall return the user to the Physical Inventory screen after click Done on the Cases screen.
QLM HHT	2	Physical Inventory		2.7.C.10	The system shall calculate the Case Qty on the Physical Inventory screen in the following manner: (Case size 1 X Case Size 1 Qty) + (Case Size 2 X Case Size 2 Qty) + (Case Size 3 X Case Size 3 Qty) + (Case Size 4 X Case Size 4 Qty) + (Case Size 5 X Case Size 5 Qty) + (Case Size 6 X Case Size 6 Qty)

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	2	Physical Inventory		2.7.C.11	The system shall allow the user to enter a Loose Qty on the Physical Inventory screen.
QLM HHT	2	Physical Inventory		2.7.C.12	The system shall total the loose qty and case qty to come up with the Total Qty.
QLM HHT	2	Physical Inventory		2.7.C.13	The system shall allow the user to save the current data, display the current location, clear the NSN, clear the description, clear all qty fields by clicking the Next NSN button.
QLM HHT	2	Physical Inventory		2.7.C.14	By clicking the Next NSN button, the system shall allow the user to scan or enter the next NSN and count and enter the case and loose qty without changing the location displayed.
QLM HHT	2	Physical Inventory		2.7.C.15	The system shall display a message, "No more NSNs on file. Click "OK" for next location. Click "New" to add a new NSN to inventory."
QLM HHT	2	Physical Inventory		2.7.C.16	The system shall allow the user to scan the next NSN bar code label or enter the NSN and proceed with the inventory of the NSN.
QLM HHT	2	Physical Inventory		2.7.C.17	The system shall allow the user to clear all data on the Physical Inventory screen by clicking a Reset button.
QLM HHT	2	Physical Inventory		2.7.C.18	After the Reset button is tapped, the system shall message the user that "All data will be lost. Continue?" Yes or No
QLM HHT	2	Physical Inventory		2.7.C.19	If the user clicks Yes, the system shall delete all data not saved and a blank Physical Inventory screen shall appear.
QLM HHT	2	Physical Inventory		2.7.C.20	If the user clicks No, the system shall cancel the Reset operation.

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	2	Physical Inventory		2.7.C.21	The system shall allow the user to click a > (Next) button to scroll through the next location records to enter, view or edit data.
QLM HHT	2	Physical Inventory		2.7.C.22	The system shall allow the user to click a < (Previous) button to scroll through the previous location records to enter/scan new NSNs and data, view data or edit data.
QLM HHT	2	Physical Inventory		2.7.C.23	The system shall allow the user to add a new location not found on the pi_count123.dat file, by clicking the Add Loc button on the Physical Inventory screen.
QLM HHT	2	Physical Inventory		2.7.C.24	After the user clicks Done, the system shall return the user to the Main QLM Processing screen.
QLM HHT	2	Physical Inventory		2.7.C.25	The system shall allow the user to select Sync (for Batch Mode) from the Inventory Menu.
QLM HHT	2	Physical Inventory		2.7.C.26	Once the user docks the Palm and clicks sync the Palm shall send the invcount123.txt file to c:\qlm\handheld.
QLM HHT	2	Stock Movement		2.7.D.01	If the user is in Batch or RF Stock Movement mode the following menu items are the only items active for the current session: <File> <Stock Movement>
QLM HHT	2	Stock Movement		2.7.D.02	The system shall provide a primary Stock Movement Tracking window with the following buttons: Send, Accept, View, Return
QLM HHT	2	Stock Movement		2.7.D.03	The system shall provide the following menu items under Stock Movement: Send, Accept, View
QLM HHT	2	Stock Movement		2.7.D.04	The Palm shall maintain a transaction number for all stock movement send transactions.

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	2	Stock Movement		2.7.D.05	The Palm system shall create a stock movement transaction send text file designated by last 3 digits of the Palm IP address, the Julian Date, a 4 digit sequence number, a designator of "s" for send transactions, and STM for stock movement. (04321820001sSTM.txt)
QLM HHT	2	Stock Movement		2.7.D.06	The Palm system shall create a stock movement transaction accept text file last 3 digits of the Palm IP address, the Julian Date, a 4-digit sequence number, a designator of "a" for accept transactions, and STM for stock movement. (04321820001aSTM.txt)
QLM HHT	2	Stock Movement		2.7.D.07	The Palm system shall send stock movement transaction text files to C:\QLM\Handheld during hotsync operations.
QLM HHT	2	Stock Movement		2.7.D.08	The Palm system shall send stock movement transaction text files to C:\QLM\Handheld during RF send operations
QLM HHT	2	Stock Movement		2.7.D.09	The stock movement-send transaction number shall consist of last 3 digits of the Palm IP address; the Julian Date, a 4-digit sequence number, and a designator of "s" for send transactions. (04321820001s)
QLM HHT	2	Stock Movement		2.7.D.10	The system shall generate only unique stock movement-send transaction numbers.

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	2	Stock Movement		2.7.D.11	The stock movement-send transaction shall contain the following data: a. Transaction Number (System Generated), b. User Id (System Captured), c. Item Number (Mandatory, user entry or NSN barcode scan entry), d. Quantity (Mandatory, user entry), e. Unit of Issue (Mandatory, user entry), f. From Location (Mandatory, user entry or location barcode scan entry), g. To Location (Mandatory, user entry or location barcode scan entry), h. Date Sent (System Captured), i. Time Sent (System Captured)
QLM HHT	2	Stock Movement		2.7.D.12	The stock movement-accept transaction shall contain the following data: a. Transaction Number (Mandatory, user entry), b. User Id (System Captured), c. Item Number (Optional), d. Quantity (Optional), e. Unit of Issue (Optional, but mandatory if Quantity data is populated), f. To Location (Mandatory, user entry or location barcode scan entry), g. Date Accepted (System Generated), h. Time Accepted (System Generated)
QLM HHT	2	Stock Movement		2.7.D.13	For stock movement-accept transactions, the Palm shall allow the user to enter the transaction number and save the transaction.
QLM HHT	2	Stock Movement		2.7.D.14	For stock movement-accept transactions, the Palm shall create the text file name based on the transaction number entered by the user (04321820001) an "a" in the 12th character field, and STM for stock movement.

System	Version	Subsystem	Date Obsolete	Requirement (ver, sect,#)	Shall Statement
QLM HHT	2	Stock Movement		2.7.D.15	For stock movement-veiw (send), the system shall allow the user to edit the NSN, qty, UI and To fields.
QLM HHT	2	Stock Movement		2.7.D.16	For stock movement-veiw (send), the system shall allow the user to save edited records.
QLM HHT	2	Stock Movement		2.7.D.17	For stock movement-veiw (send), the system shall allow the user to send all displayed records from the View screen.
QLM HHT	2	Stock Movement		2.7.D.18	For stock movement-veiw (accept), the system shall allow the user to send all displayed records from the View screen.
QLM HHT	2	Stock Movement		2.7.D.19	The Palm system shall maintain the tracking number sequence (0001-XXXX) for each Julian Date. The system shall start each new Julian Date sequence with 0001.

QLM/Local System Reports

Inventory Control Log									
Location	NSN	Index #	User ID	Count 1 Qty	User ID	Count 2 Qty	User ID	Count 3 Qty
01205a	8405-01-276-8978	A0123	cfraser	250	cfraser	375	rebona	250
01206a	8750-01-569-8741	A01234	cfraser	300	cfraser	300		
01206b	8775-01-245-3689	A01256	cfraser	200	cfraser	320	rebona	320

Stock Movement Tracking Report									
Item Number	QTY	UI	From Location	To Location	Date/Time Sent	User Id Sending	Date/Time Accepted	Qty Accepted	User Id Accepting
8405-01-276-8978	350	EA	Receiving	01206b	09/09/02 0930	cfraser	09/09/02 1100	350	rebona
8750-01-569-8741	250	EA	Receiving	01206c	09/10/02	cfraser	09/10/02	225	rebona
8775-01-245-3689	200	EA	Receiving	Bulkstor	09/11/02	cfraser			

IX. Palm Screens

Physical Inventory

Physical Inventory

Location _____

Stock # _____

Description_____

_____

Cases

Case Qty   _calc___

Loose Qty _____

Total Qty   __calc__

Next NSN

Next Loc   Add Loc

<   >   Reset   Done

CASES

2nd Case Size: ___12____

\# Full Cases: ___25____

_____

3rd Case Size: ___20____

Done   ases: ___7_____

View Inventory

Done   Send

NSN: QTY   UI

1234567890123   12345 EA

1234567890124   12300 PR

Receipt Processing

Receipt Processing

Document # _____

Stock # _____

Source _____

Purchase Unit _____

Qty Received

| Description | Location/Qty | Due-In |

| Save | Done | Reset | Send |

Location/Qty

Index # _____

Bin Loc _____

Bulk Loc_____

Qty on Hand: Issue Unit:

_____   _____

Avg Daily Use: Days On Hand:

_____ [OK] _____

Description

Description

_____ [OK] _____

Due-In

Document #   _____

Original Qty   _____

Qty Remaining   _____

Last Suffix Code Used: _____

[OK]

View Receipts

| Edit | Save | Done | Rese | Send |

NSN: QTY   UI

1234567890123   12345 AA

1234567890123   12345 AA

Stock Movement

Stock Movement Tracking

Send Stock   Accept Stock   View

Return

Stock Movement Tracking - Send

NSN: (XXXX-XX-XXX-XXXX)

QTY: (XXXXX) UI: (XX)

From Location: (XXXXXXXXXX)

Send To Location: (XXXXXXXXXX)

Tracking #   >

Save   Done   Rese   Send

Stock Movement Tracking - Ac

NSN: (XXXX-XX-XXX-XXXX)

QTY: (XXXXX) UI: (XX)

Final Location: (XXXXXXXXXX)

Tracking # _04321821234_

Save   Done   Rese   Send

Stock Movement Tracking View Accept

Edit   Save   Done   Rese   Send

NSN: QTY   UI
1234567890123   12345 A
        To: FGHIJ67890
        Tracking #: 043YDDD1 34
        Date: mm/dd/yyyy
        Time: hhmmss
            12345 AA
        To: FGHIJ67890
        Tracking #: 043YDDD1 35
        Date: mm/dd/yyyy
        Time: hhmmss

Stock Movement Tracking View Send

| Edit | Save | Done | Rese | Send |

NSN: QTY   UI
1234567890123   12345 A
       From: ABCDE12345
       To: FGHIJ67890
       Tracking #: 043YDDD1 34
       Date: mm/dd/yyyy
       Time: hhmmss
1234567890123   12345 A
       From: ABCDE12345
       To: FGHIJ67890
       Tracking #: 043YDDD1235
       Date: mm/dd/yyyy

Appendix D

Changes to Original Assessment Report Recommendations

Changes to Original Recommendations

During the implementation of the funded recommendations in the technology report, several modifications to the draft ARN Technology Assessment report have been made. These changes will be listed below with the paragraph number from the body of the report. In so doing, users will provided with a cross reference back to the initial assessment data and recommendations.

Paragraph V. Smart Card Integration to AutoData Scan Forms

Originally the technology report indicated that a Smart Card reader would be connected to a computer in the Phase II area. The intent was to allow an automatic capture of a recruit's data if for some reason the recruit's name and scan form were not available for the platoon being processed.

The modification to this has been to create a GUI interface from the Cyberware DigiSize.exe. Any recruit whose name does not appear on the platoon list, will have their data enterd thru the GUI to the scanned tcl file. Female recruits will scan their Smart Card to add a name to the platoon list.

Paragraph VIII. Radio Frequency Networking of Inventory Data

Originally the design of the RF network incorporated installation of 5 network access points (NAPs) and MCRD-PI would provide the network cable requirements. In order to connect NAPs in buildings 694 and 695, MCRD-PI would have had to lay cable under a heavily used street. This cabling requirement was near the bottom of the MCRD-PI priority list. In order to connect these two bulk warehouse buildings to the ARNLAN thru the RF network, a 6th NAP was added to the exterior wall of building 6007 and connected to the ARNLAN. The NAP in building 694 and the NAP in building 695 will connect wirelessly to the 6th NAP. This provides complete RF coverage to buildings 694 and 695.

Originally the intent of the HHT data security was to utilize AES encryption standards. This has proven to be impossible with the current PALM operating system. We are currently using WEP, 128 bit encryption and are researching the cost of using the Application VPN Client solution offered by Symbol. This solution is certified by the Federal Government and establishes AES and DDDES security. As an interim solution, the NAPs and HHTs will be upgraded to incorporate a Symbol proprietary product called Key Guard. This product provides additional security by ensuring that every packet has a new encryption key as opposed to the static encryption key used with the WEP 128 bit technology. This means that a key will not repeat during a 10 year period.

Paragraph IX. 3D Body Scanner

The only changes made to the 3D Body Scanner assessment are procedural. Recruits now are fitted for their Phase II uniforms in week 8 as opposed to week 4, and the week 8 Phase II appointment is now a

full day as opposed to the 4-6 hour appointment of week 4. This means that all recruits can be scanned through the 3D Body Scanner without the concern of slowing down the issue process. And lastly, instead of scanning only the forms that did not use the predicted size, all forms are being scanned. To allow the site to keep an archive of the recruits issue form in CabinetNG, all forms need to be scanned in order to capture the form image.

The technology report also recommended the interface between the 3D Body Scan data and the Electronic Order Form (EOF) developed by Clemson University. There are no dollars available to incorporate the special measurement interface to the EOF. Less than 1% of all recruits at Parris Island require a special measurement garment, so; not incorporating this interface will not interrupt operations at MCRD-PI nor would the incorporation of the interface enhance the issue process.

Paragraph X. Satellite Communications Technology

The Satellite Communications technology implementation was dropped from the project. The speed and reliability of the digital cable modem far exceeds the perceived speed and reliability of the satellite technology and a recommendation was made to the Program Manager that we proceed with only the digital cable modem. The Program Manager agreed to this recommendation.